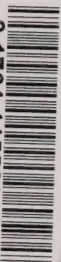



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# ARCHITECTURAL CONSERVATION TECHNOLOGY

(4)

## VOLUME I PROJECT MANAGEMENT

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
OTTAWA



Canadian Heritage  
Parks Canada

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OTTAWA

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**NOTE:** Since this manual was in production when federal government departments were restructured in 1993, it was impossible to update all in-text government references. The Canadian Parks Services (CPS) of Environment Canada is now Parks Canada of the Department of Canadian Heritage, and Public Works is now part of the Department of Government Services.

**I**ncluded within the seven volumes of the ACT manual is both basic and specialized information on architecture, engineering and landscape works.

References at all levels within these disciplines, useful both in practice and in training, are intended to:

- introduce and familiarize the user with conservation concerns;
- serve as an "aide-mémoire" at both the design and managerial levels; and
- provide guidance to professional consultants responsible for recording and analysing historic structures, and applying recommended conservation methods to their protection and preservation.

All procedures outlined in these publications should be read in conjunction with the reference material, manufacturer's literature and the relevant Canadian Parks Service – National Historic Sites Management Directives.

In all matters where detailed specifications are required, such as building codes, fire regulations and the use of chemicals, the prevailing and local references and regulations must be consulted and applied.

**P**lease note that the ACT manual has been prepared within the context of Parks Canada Policy (1979). The newly proposed Canadian Parks Service Policy (1990) establishes additional and broader directions that, however, do not alter the orientation of the technical material covered. The ACT manual reflects the well established principles of conservation as defined by national and international charters and conventions – see Vol. I Appendix.

Within the proposed policy, the Cultural Resource Management (CRM) section (see Vol. I, Appendix 5.17) establishes the overall framework for the conservation and presentation of the cultural assets administered by CPS, on all CPS properties, including those in National Historic Sites, Historic Canals, National Parks, National Marine Parks, and other CPS properties. In the event of a conflict between the direction provided by the ACT manual and that provided by CRM Policy, the latter applies.

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Table 1: Summary of the results of the study.	
Variable	Value
Mean	1.2
Standard Deviation	0.5
Minimum	0.5
Maximum	2.0
Median	1.0
Mode	1.0
Range	1.5
Skewness	0.2
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3. The third part of the report is a discussion of the results of the study. It discusses the findings of the study and their implications for the field of research. It also provides a conclusion to the study and suggests areas for further research.



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*Architectural Conservation Technology* (ISBN 0-660-14657-6; DSS Cat. no. W62-16/1993E) is a manual of seven volumes. Each volume may be bought separately. Here are the contents and numbers for each one.

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# **VOLUME I**

# **PROJECT MANAGEMENT**

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## **STANDARDS FOR ARCHITECTURAL CONSERVATION**

PRODUCED BY:  
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## 1.0 INTRODUCTION

The concept of a charter or code of ethics promoting the highest standards of practice in work on historic sites and structures has been with us for over 50 years.

The first systematic attempt to promulgate such principles occurred in 1931 during the Athens Conference on restoration of historic buildings organized by the International Museums Office. These discussions reflected a growing interest in the cultural dimensions of internationalism, accompanying the creation of the League of Nations after World War I. The Athens Charter was adopted in 1932 by the Assembly of the League of Nations.



*Church of Santa Maria Della Salute, 1631–82, Venice, IT.*

## 2.0 INTERNATIONAL CHARTERS

### 2.1 THE VENICE CHARTER

The Athens Conference also recommended creation of an association of specialists involved in the conservation of historic structures. Though such a group did not meet until 1957—the First International Congress of Architects and Specialists of Historic Buildings, held in Paris—their second meeting in 1964 in Venice resulted in a number of momentous resolutions: the first, The International Charter for the Conservation and Restoration of Monuments and Sites (The Venice Charter) superseding the Athens Charter and the second, a resolution put forward by UNESCO, providing for the creation of ICOMOS (International Council on Monuments and Sites).

Since the approval of the Venice Charter, in excess of one hundred international symposia have been convened by ICOMOS, on subjects ranging from the technical (conservation of deteriorated wood, photogrammetric recording) to the theoretical (integration of modern architecture, conservation of urban sites, historic buildings and society). These have brought concerned professionals in contact with others dealing with similar problems, have brought proven technological expertise within the reach of all and have ensured ongoing dialogues promoting greater professional and public concern in the care afforded our cultural heritage.

### 2.2 UNESCO RECOMMENDATIONS

UNESCO, in its general conferences, has dedicated many of its sessions to producing recommendations on various cultural matters. Two of these are of particular significance for conservation of historic sites: the Recommendations Concerning the Preservation of Cultural Property Endangered by Public or Private Works (Paris, November 19, 1968) and the Recommendations Concerning the Protection, at the National Level of the Cultural and Natural Heritage (Paris, November 16, 1972).





### 3.0 NATIONAL CHARTERS

#### 3.1 BURRA CHARTER: AUSTRALIA

The Australian National Committee, Australia ICOMOS, has been noticeably successful in development of a home-grown charter. Their efforts culminated in 1981, in the proclamation of the Burra Charter. Though, in content, a relatively cautious restatement or recodification of principles embodied in the Venice Charter, the Burra Charter's importance lies in its advocacy of a detailed and comprehensive conservation plan in advance of any project spending and in its use, by government, to supply criteria in awarding grants for work on historic buildings. As well, the professional membership of Australia ICOMOS has been envisioned as a resource to guide clients and the public to those architects prepared to maintain the high standards embodied in

the charter. Indeed, member architects who have offended the spirit of the charter in their project work, have been removed from the list of qualified architects maintained by the organization.

#### 3.2 STANDARDS FOR REHABILITATION: UNITED STATES

The U.S. "Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings," developed by the Secretary of Interior in connection with the National Register of Historic Places, has similarities to our Federal Heritage Buildings Policy. While the Venice Charter emphasizes the activities of the conservation and limited restoration, the Standards for Rehabilitation are broader in scope. They reflect American interest in the federally co-ordinated recycling and adaptive reuse of a wide variety of properties.



*Deschambault Rectory, PQ.  
Drawing by Julian Smith*

## 4.0 CANADA

### 4.1 DECLARATION OF DESCHAMBAULT

In Canada, following the division of ICOMOS Canada into French- and English-speaking committees in 1980, the French Committee and the Conseil des monuments et sites du Québec developed a charter for use in Quebec. The Charte de Conservation du Patrimoine Québécois, commonly known as the Declaration of Deschambault, though focused primarily on preservation of a uniquely Québécois heritage, represents a major step forward from the Venice Charter, in its promotion of public participation in decision-making and in its efforts to view heritage conservation in a wider social context. This charter has not yet been formally adopted by the French-speaking Committee or by the Conseil des monuments et sites du Québec.

### 4.2 APPLETON CHARTER

On August 5 and 6, 1983, members of the English-speaking Committee met in Appleton, Ontario, and prepared a draft charter for English-speaking Canada, to complement that produced by the French-speaking Committee. The Appleton Charter for the Protection and Enhancement of the Built Environment seeks to do two things: to dispose the traditional tenets of conservation within an ordered framework and, like the Declaration of Deschambault, to place this approach in a wider and socially responsible context.

### 4.3 IIC-CG CODE OF ETHICS

On May 18, 1985, the membership of the International Institute for Conservation, Canadian Group approved a Code of Ethics and Guidance for Practice for those Involved in the Conservation of Cultural Property in Canada. This document was designed to serve as a guide for conservators and as an outline of obligations for their clients and employers, as well as for the conservation of cultural heritage.

### 4.4 THE PRESENT SITUATION

Canada has no single national set of standards of its own to guide the conservation of historic properties. A number of provincial agencies are in the process of creating reference documents for their own use. Of these, the most significant are the Ontario

Heritage Foundation's (OHF) "Manual of Principles and Practice for Architectural Conservation" under development for the provincial Ministry of Culture and Communication and the Commission des biens culturels du Québec's "Principes et critères de restauration et d'insertion" under development for the provincial Ministère des Affaires culturelles.

At the same time, the Doctrine Committee of ICOMOS Canada is exploring the possibility of a common set of principles for conservation activity bringing together the experiences of the French-speaking and English-speaking committees of ICOMOS Canada.

A commentary on the Venice Charter has been prepared by an interdepartmental committee for interim use by the Federal Heritage Buildings Program until such time as ICOMOS Canada or others may develop a formal charter or set of principles, for national use (see Appendix 5.2).

The most important of the documents currently in use by Canadian conservation professionals are reproduced in the Appendix 5.0.

For more information on the OHF's "Manual of Principles and Practice for Architectural Conservation," please contact the

Ontario Heritage Foundation,  
77 Bloor Street West,  
Toronto, ON,  
M7A 2R9.



Joseph Teskey House, Appleton, ON.  
Drawing by Julian Smith.

*Illustrations are the property of the Heritage Conservation Program, unless otherwise noted.*





# APPENDIX



# ICOMOS

INTERNATIONAL COUNCIL ON MONUMENTS AND SITES

## THE VENICE CHARTER

INTERNATIONAL CHARTER FOR THE  
CONSERVATION AND RESTORATION OF MONUMENTS AND SITES



Imbued with a message from the past, the historic monuments of generations of people remain to the present day as living witnesses to their age-old traditions. People are becoming more and more conscious of the unity of human values and regard ancient monuments as a common heritage. The common responsibility to safeguard them for future generations is recognized. It is our duty to hand them on in the full richness of their authenticity.

It is essential that the principles guiding the preservation and restoration of ancient buildings should be agreed upon and be laid down on an international basis, with each country being responsible for applying the plan within the framework of its own culture and traditions.

By defining these basic principles for the first time, the Athens Charter of 1931 contributed towards the development of an extensive international movement which has assumed concrete form in national documents, in the work of ICOM and UNESCO and in the establishment by the latter of the International Centre for the Study of the Preservation and the Restoration of Cultural Property. Increasing awareness and critical study have been brought to bear on problems which have continually become more complex and varied; now the time has come to examine the Charter afresh in order to make a thorough study of the principles involved and to enlarge its scope in a new document.

Accordingly, the II<sup>nd</sup> International Congress of Architects and Technicians of Historic Monuments which met in Venice from May 25th to 31st, 1964, approved the following text:

## DEFINITIONS

**ARTICLE 1.** The concept of an historic monument embraces not only the single architectural work but also the urban or rural setting in which is found the evidence of a particular civilization, a significant development or an historic event. This applies not only to great works of art but also to more modest works of the past which have acquired cultural significance with the passing of time.

**ARTICLE 2.** The conservation and restoration of monuments must have recourse to all the sciences and techniques which can contribute to the study and safeguarding of the architectural heritage.

**ARTICLE 3.** The intention in conserving and restoring monuments is to safeguard them no less as works of art than as historical evidence.

## CONSERVATION

**ARTICLE 4.** It is essential to the conservation of monuments that they be maintained on a permanent basis.

**ARTICLE 5.** The conservation of monuments is always facilitated by making use of them for some socially useful purpose. Such use is therefore desirable but it must not change the lay-out or decoration of the building. It is within these limits only that modifications demanded by a change of function should be envisaged and may be permitted.

**ARTICLE 6.** The conservation of a monument implies preserving a setting which is not out of scale. Wherever the traditional setting exists, it must be kept. No new construction, demolition or modification which would alter the relations of mass and colour must be allowed.

**ARTICLE 7.** A monument is inseparable from the history to which it bears witness and from the setting in which it is located. The moving of all or part of a monument cannot be allowed except where the safeguarding of that monument demands it or where it is justified by national or international interests of paramount importance.

**ARTICLE 8.** Items of sculpture, painting or decoration which form an integral part of a monument may only be removed from it if this is the sole means of ensuring their preservation.

## RESTORATION

**ARTICLE 9.** The process of restoration is a highly specialized operation. Its aim is to preserve and reveal the aesthetic and historic value of the monument and is based on respect for original material and authentic documents. It must stop at the point where conjecture begins and in this case moreover any extra work which is indispensable must be distinct from the architectural composition and must bear a contemporary stamp. The restoration in any case must be preceded and followed by an archaeological and historical study of the monument.

**ARTICLE 10.** Where traditional techniques prove inadequate, the consolidation of a monument can be achieved by the use of any modern technique for conservation and construction, the efficacy of which has been shown by scientific data and proved by experience.

**ARTICLE 11.** The valid contributions of all periods to the building of a monument must be respected since unity of style is not the aim of a restoration. When a building includes the super- imposed work of different periods, the revealing of the underlying state can only be justified in exceptional circumstances and when what is removed is of little interest and the material which is brought to light is of great historical, archaeological or aesthetic value, and its state of preservation good enough to justify the action. Evaluation of the importance of elements involved and the decision as to what may be destroyed cannot rest solely on the individual in charge of the work.

**ARTICLE 12.** Replacements of missing parts must integrate harmoniously with the original so that restoration does not falsify the artistic or historic evidence.

**ARTICLE 13.** Additions cannot be allowed except in so far as they do not detract from the interesting parts of the building, its traditional setting, the balance of its composition and its relation with its surroundings.

## HISTORIC SITES

**ARTICLE 14.** The sites of monuments must be the object of special care in order to safeguard their integrity and ensure that they are cleared and presented in a seemly manner. The work of conservation and restoration carried out in such places should be inspired by the principles set forth in the foregoing articles.

## EXCAVATIONS

**ARTICLE 15.** Excavations should be carried out in accordance with scientific standards and the recommendation defining international principles to be applied in the case of archaeological excavation adopted by UNESCO in 1956.

Ruins must be maintained and measures necessary for the permanent conservation and protection of architectural features and of objects discovered must be taken. Furthermore, every means must be taken to facilitate the understanding of the monument and to reveal it without ever distorting its meaning.

All reconstruction work should, however, be ruled out a priority. Only anastylosis, that is to say, the reassembling of existing but dismembered parts can be permitted. The material used for integration should always be recognizable and its use should be the least that will ensure the conservation of a monument and the reinstatement of its form.

## PUBLICATION

**ARTICLE 16.** In all works of preservation, restoration or excavation, there should always be precise documentation in the form of analytical and critical reports, illustrated with drawings and photographs.

Every stage of the work of clearing, consolidation, re-arrangement and integration, as well as technical and formal features identified during the course of the work, should be included. This record should be placed in the archives of a public institution and made available to research workers. It is recommended that the report be published.

The following persons took part in the work of the Committee for drafting the International Charter for the Conservation and Restoration of Monuments:

Mr. Piero Gazzola (Italy), Chairman  
 Mr. Rymond Lemaire (Belgium), Reporter  
 Mr. José Bassegoda-Nonell (Spain)  
 Mr. Luis Benavente (Portugal)  
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 Mr. Mustafa S. Zbiss (Tunisia)



# **FEDERAL HERITAGE BUILDINGS REVIEW OFFICE**

GUIDELINES FOR INTERVENTION

COMMENTARY ON THE VENICE CHARTER



**ARTICLE 1.** "The concept of an historic monument embraces not only the single architectural work but also the urban or rural setting in which is found the evidence of a particular civilization, a significant development or an historic event. This applies not only to great works of art but also the more modest works of the past which have acquired cultural significance with the passing of time."

For the purposes of the Government of Canada, an historic monument is any real property of cultural significance designated by the Historic Sites and Monuments Board of Canada or by the Federal Heritage Building Review Office. Such designation considers the historical, architectural and environmental qualities of the property, and may be applied to buildings, archaeological sites, engineering works, gardens and landscapes, singly or in combination.

**ARTICLE 2.** "The conservation and restoration of monuments must have recourse to all the sciences and techniques which can contribute to the study and safeguarding of the architectural heritage."

The terms "sciences" and "techniques" must be interpreted in their broadest sense to include all relevant areas of theory and practice. A balance must be maintained between scientific and humanistic disciplines.

An interdisciplinary approach is fundamental to the success of all phases of conservation and restoration activity.

**ARTICLE 3.** "The intention in conserving and restoring monuments is to safeguard them no less as works of art than as historical evidence."

The intention is also to safeguard them as successful or important pieces of an environment. The overall FHBRO activity can be considered as a device for managing the built environment, taking into account the three general areas of design (art), historical evidence, and environmental quality.

**ARTICLE 4.** "It is essential to the conservation of monuments that they be maintained on a permanent basis."

"Permanent" should be understood as "ongoing," as well as implying that these measures provide long-term solutions.

(To ensure appropriate and non-destructive measures, professional and technical standards for maintenance must be developed as part of the FHBRO program.)

**ARTICLE 5.** "The conservation of monuments is always facilitated by making use of them for some socially useful purpose. Such use is therefore desirable but it must not change the layout or decoration of the building. It is within these limits only

that modifications demanded by a change of function should be envisaged and may be permitted."

Where possible, the original function should be maintained.

In some instances, this may be important for historical and environmental reasons even if minor changes in layout or decoration are required as a result of functional evolution.

When a current function is not the original and not particularly compatible, consideration should be given to reinstating the original use or finding a more compatible new use.

Control over changes to layout and decoration is important primarily as these changes might affect the heritage character of the property. In this context, both "layout" and "decoration" must be interpreted broadly to include the entire organization and physical attributes of the property.

**ARTICLE 6.** "The conservation of a monument implies preserving a setting which is not out of scale."

Wherever the traditional setting exists, it must be kept. No new construction, demolition or modification which would alter the relations of mass and colour must be allowed.

"Setting" is understood as the relationship between a historic structure or landscape and its surrounding property or properties. The setting may extend well beyond the property area directly controlled by the owner; in this case the article applies in principle but may not be directly enforceable.

Zones of protection may have to be established on a case by case basis. The restrictions set out in this article apply more strictly to "Classified" than to "Recognized" properties.

In all cases, the "relations of mass and colour" should be understood more broadly as the "heritage character" of the property in question.

**ARTICLE 7.** "A monument is inseparable from the history to which it bears witness and from the setting in which it occurs. The moving of all or part of a monument cannot be allowed except where the safeguarding of that monument demands it or where it is justified by national or international interests of paramount importance."

The moving of a building or engineering work designated under the Federal Heritage Buildings policy could result in the removal of that property from the Register. This question would have to be resolved for each specific case in relation to the original reasons for designation and the description of heritage character.

**ARTICLE 8.** "Items of sculpture, painting or decoration which form an integral part of a monument may only be removed from it if this is the sole means of ensuring their preservation."

Attention should also be drawn to Article 5 of the U.S. Secretary of the Interior's Standards for Rehabilitation which states that "distinctive stylistic features or examples of skilled craftsmanship which characterize a building, structure or site shall be treated with sensitivity."

On occasion, items of exterior decorative treatment such as cornices and gargoyles are determined to be threats to public safety. Every attempt should be made to reinforce in situ. If this is not possible, the original work should be recorded in place and stored. Consideration should then be given to replacement with substitute materials to maintain the appearance.

**ARTICLE 9.** "The process of restoration is a highly specialized operation. Its aim is to preserve and reveal the aesthetic and historic value of the monument and is based on respect for original material and authentic documents. It must stop at the point where conjecture begins, and in this case moreover any extra work which is indispensable must be distinct from the architectural composition and must bear a contemporary stamp. The restoration in any case must be preceded and followed by an archaeological and historical study of the monument."

As a "highly specialized operation," restoration work requires the use of qualified professionals, whether employed directly or as consultants and contractors.

(Further professional/technical standards for in-house and consultant responsibility need to be developed by the program.)

To "aesthetic and historical value" can be added "environmental significance."

In addition to avoiding conjecture, attention should also be drawn to Article 3 of the U.S. Secretary of the Interior's Standards for Rehabilitation, which states that "all buildings, structures and sites shall be regarded as products of their own time" and that "alterations that have no historical basis and which seek to create an earlier appearance shall be discouraged."

New work should bear a contemporary stamp, but this differentiation need not be aggressive. It may be clearly visible only to the trained eye. The issue becomes one of the sensitivity of the contemporary design to the heritage character of the property.

Prior archaeological study is essential whenever significant resources may be disturbed. Both archaeological and historical study must be seen as an integral part of design and site development.

Systematic recording and documentation is to be considered part of any research activities.

**ARTICLE 10.** "Where traditional techniques prove inadequate, the consolidation of a monument can be achieved by the use of any modern technique for conservation and construction,

the efficacy of which has been shown by scientific data and proved by experience."

The failure over the long-term of many modern techniques which were quite convincing over the short-term underscores the need for proof by experience. An adequate testing period is more likely to be 12 years than 12 months. (More detailed professional/technical standards are required.)

In addition to consolidation techniques, the introduction of contemporary building services also raises the issue of long-term effects. Reference should be made to the article in the Appleton Charter (ICOMOS Canada) which states that "systems of insulation, environmental control and other servicing should be upgraded in ways that respect the existing and traditional equilibria and do not set in motion processes of deterioration."

**ARTICLE 11.** "The valid contributions of all periods to the building of a monument must be respected, since unity of style is not the aim of a restoration.

When a building includes the superimposed work of various periods the revealing of the underlying state can only be justified in exceptional circumstances and when what is removed is of little interest and the material which is brought to light is of great historical, archaeological or aesthetic value and its state of preservation good enough to justify the action. Evaluation of the importance of the elements involved and the decision as to what may be destroyed cannot rest solely on the individual in charge of the work."

The importance of avoiding the "unity of style" approach, which can be destructive of true historic material, is repeated in Article 4 of the U.S. Secretary of the Interior's Standards for Rehabilitation. It states the "changes which may have taken place in the course of time are evidence of the history and development of a building, structure or site and its environment. These changes may have acquired significance in their own right, and this significance shall be recognized and respected."

The need for a broad consensus on what to destroy and what to maintain reinforces the need for an interdisciplinary team approach to conservation and restoration activity.

**ARTICLE 12.** "Replacements of missing parts must integrate harmoniously with the whole but at the same time must be distinguishable from the original so that restoration does not falsify the artistic or historic evidence."

Extensive documentation and accurate reproduction techniques allow us to make new work virtually indistinguishable from the old work. This is particularly true of products of an industrialized society, where mass production techniques were used originally. However, an approach which attempts to blur

the distinction between new and old threatens an understanding of the intrinsic value of historic material and can lead to wide scale destruction and replacement.

It is essential, therefore, that new work be distinguishable at least to the trained eye, and that it be clearly documented for future researchers. The nature and detailing of replacement work should have its own internal consistency. How much it is differentiated will depend partly on the strength of the original. As stated in the Appleton Charter (ICOMOS Canada), new work "should not impair the aesthetic integrity or coherence of the whole."

**ARTICLE 13.** "Additions cannot be allowed except insofar as they do not detract from the interesting parts of the building, its traditional setting, the balance of its composition and its relation with its surroundings."

A restrictive approach to additions is appropriate to Classified properties; where possible their historic form and integrity should not be impaired. For Recognized properties, additions may be permitted if they complement and enhance the heritage character of the original.

The design of additions must arrive at an appropriate balance between harmony of the whole and distinguishability of the new work. This demands a high level of expertise and an interdisciplinary approach.

**ARTICLE 14.** "The site of monuments must be the object of special care in order to safeguard their integrity and ensure that they are cleared and presented in a seemingly manner. The work of conservation and restoration carried out in such places should be inspired by the principles set forth in the foregoing article."

In some cases, the site itself may be the monument. In all cases, the site must be given the same level of understanding and attention as other elements which make up a historic property.

Such sites may be large gardens or rural landscapes, but may also be urban environments which though small in scale are equally important as artistic or historical evidence, or as elements of environmental quality.

Reference should be made to the Florence Charter (ICOMOS) for more specific principles governing the conservation and restoration of historic gardens.

**ARTICLE 15.** "Excavations should be carried out in accordance with scientific standards and the recommendation defining international principles to be applied in the case of archaeological excavation adopted by UNESCO in 1956.

Ruins must be maintained and measures necessary for the permanent conservation and protection of architectural features and of objects discovered must be taken. Furthermore, every means must be taken to facilitate the understanding of the monument and to reveal it without ever distorting its meaning.

All reconstruction work should however, be ruled out a priori. Only anastylosis, that is to say, the reassembling of existing but dismembered parts can be permitted. The material used for integration should always be recognizable and its use should be the least that will ensure the conservation of a monument and the reinstatement of its form."

All excavations on properties of Classified or Recognized significance will be subject to control. Archaeological investigations should be carried out beforehand in any cases where it is suspected that historic artifacts may be disturbed (more specific technical guidelines need to be developed).

Sites which are significant primarily as ruins or for their archaeological evidence should normally be submitted to the Historic Sites and Monuments Board of Canada for consideration.

**ARTICLE 16.** "In all works of preservation, restoration or excavation, there should always be precise documentation in the form of analytical and critical reports illustrated with drawings and photographs. Every stage of the work of clearing, consolidation, rearrangement and integration, as well as technical and formal features identified during the course of the work should be included. This record should be placed in the archives of a public institution and made available to research workers. It is recommended that the report should be published."

This article emphasizes the importance of integrating the many products of analysis and recording in order to provide a complete project dossier. (More specific technical guidelines on documentation during the various phases of evaluation, designation and significant intervention need to be developed.)

A copy of this documentation, for Classified and Recognized buildings, should be deposited with the National Archives of Canada.

# ICOMOS

TOURISM COMMITTEE

## CHARTER OF CULTURAL TOURISM

PUBLISHED IN CO-OPERATION WITH  
VAN CLÉ-STICHTING / FONDATION VAN CLÉ



ADOPTED BY ICOMOS, NOVEMBER, 1976.

## INTRODUCTION

1. ICOMOS aims to encourage the safeguarding and to ensure the conservation and promotion of monuments and sites - that privileged part of the human heritage.

In this capacity, it feels directly concerned by the effects - both positive and negative - on said heritage due to the extremely strong development of tourist activities in the world.

2. ICOMOS is conscious that today - even less than before - the isolated effort of any body, however powerful be it in its own sphere, can validly influence the course of events. This is why it has attempted to participate in joint reflection with the large world and regional organizations which in one capacity or another share in its preoccupations and which are likely to contribute to the implementation of a universal, coherent and efficacious effort.

3. The Representatives of these bodies, who met in Brussels, Belgium, on 8 and 9 November 1976 at the International Seminar on Contemporary Tourism and Humanism have agreed to the following:

## I. BASIC POSITION

1. Tourism is an irreversible social, human, economic and cultural fact.

Its influence in the sphere of monuments and sites is particularly important and can but increase because of the known conditions of that activity's development.

2. Looked at in the perspective of the next twenty-five years, in the context of the phenomena of expansion which may have heavy consequences and which confront the human race, tourism appears to be one of the phenomena likely to exert a most significant influence on Man's environment in general and on monuments and sites in particular. In order to remain bearable this influence must be carefully studied, and at all levels be the object of a concerted and effective policy. Without claiming to meet this need in all its aspects, the present approach which is limited to cultural tourism constitutes, it is believed, a positive element in the global solution which is required.

3. Cultural tourism is that form of tourism whose object is, among other aims, the discovery of monuments and sites. It exerts on these last a very positive effect insofar as it contrib-

utes - to satisfy its own ends - to their maintenance and protection. This form of tourism justifies in fact the efforts which said maintenance and protection demand of the human community because of the socio-cultural and economic benefits which they bestow on all the populations concerned.

4. Whatever, however, may be its motivations and the ensuing benefits, cultural tourism cannot be considered separately from the negative, despoiling or destructive effects which the massive and uncontrolled use of monuments and sites entails. The respect of the latter, just like the elementary wish to maintain them in a state fit to allow them to play their role as elements of touristic attraction and of cultural education, implies the definition and implementation of acceptable standards.

In any case, with the future in mind, it is the respect of the world, cultural and natural heritage which must take precedence over any other considerations however justified these may be from a social, political or economic point of view.

Such respect cannot be ensured solely by policies regarding the siting of equipment and of guidance of the tourist movement based on the limitations of use and of density which may not be disregarded without impunity.

Additionally one must condemn any siting of tourist equipment or services in contradiction with the prime preoccupation due to the respect we owe to the existing cultural heritage.

## II. BASIS FOR ACTION

Resting on the foregoing,

- the bodies representing tourism, on the one hand, and the protection of the natural and monumental heritage, on the other, deeply convinced that the protection and promotion of the natural and cultural heritage for the benefit of the many cannot be ensured unless it be in an orderly fashion, i.e. by integrating cultural assets into the social and economic objectives which are part of planning the resources of the states, regions and local communities,
- acknowledge with the greatest interest the measures which each of them states it is prepared to take in its own sphere of influence as expressed in the appendices to the present Declaration,
- appeal to the will of the states to ensure the fast and energetic implementation of the International Conven-

tion for the Protection of the World Cultural and Natural Heritage adopted on 16 November 1972 and of the Nairobi Recommendation,

- trust that the World Tourist Organization fulfilling its aims and UNESCO, in the framework of the Convention mentioned above, shall exert all efforts in cooperation with the signatory bodies and all others who in future may rally to ensure the implementation of the policy which the signatory bodies have defined as the only one able to protect Mankind against the effects of tourism's anarchical growth which would result in the denial of its own objectives.

They express the wish that the states by the means of their administrative structures, shall adopt all appropriate measures to facilitate the **information** and **training** of persons traveling for tourist purposes inside and out of their country of origin.

Conscious of the acute need which prevails now to change the attitude of the public at large towards the phenomena, they express the wish that from school age onwards children and adolescents be educated to understand and respect the monuments, the sites and the cultural heritage and that all written, spoken or visual information media should express to the public the elements of the problem thereby efficaciously contributing to effective universal understanding.

Unanimous in their concern for the protection of the cultural patrimony which is the very basis of international tourism, they undertake to help in the fight initiated on all fronts against the destruction of said heritage by all known sources of pollution; and they appeal to the architects and scientific experts of the whole world so that the most advanced resources of modern technology be used for the protection of monuments.

They recommend that the specialists who shall be called upon to conceive and implement the touristic use of the cultural and the natural heritage should receive training adapted to the multifaceted nature of the problem, and should be associated from the outset in the programming and performance of the development and tourist equipment plans.

They solemnly declare that their action is to respect and protect the authenticity and diversity of the cultural values in developing regions and countries as in industrialized nations since the fate of Mankind's cultural heritage is of the very same nature everywhere in the face of tourism's likely expansion.

### *Signatories:*

Académie internationale du tourisme (ACIT), M. Francis Palemro Président

Alliance internationale du tourisme (AIT), M. KABES Secrétaire général

Association internationale d'experts scientifiques du tourisme (Aiest), Professeur Kaspar Président;

Association internationale de l'hôtellerie (AIH), M. Lauri Sarkia Président

Association internationale des jardins historiques (AIJH), M. René Pechere Président

Bureau international du tourisme social (BITS), Mme TROISGROS Bureau internationale du tourisme social (BITS), Mme Troisgros Présidente

Europa Nostra (EN), M. Richard Hare Directeur

European Travel Commission (ETC), M. Arthur Haulot Vice-président

Fédération internationale des auberges de jeunesse (FIAJ), M. Piet Kimzeke Président

Fédération de l'automobile (FIA), M. J.J. Freville Secrétaire général

Fédération internationale des journalistes et écrivains de tourisme (FIJET), M. Jean-Paul Delfeld Président

Fédération universelle des associations d'agences de voyages (FUAHV), M. Juliano Magnoni Président honoraire

Fondation Van Clé/Van Clé- Stichting (FVC/VCS), M. R.H. Lecourte. Administrateur-délégué

Conseil international des monuments et des sites (ICOMOS), M. Raymond Lemaire Président

Institution internationale des châteaux historiques (IICH), M. Anton de Zwaan Secrétaire général

Organisation mondiale du tourisme (OMT), M. Robert Lonati Secrétaire général

Union internationale des architectes (UIA), M. Victor-Gaston Martiny, Délégué

Union internationale pour la conservation de la nature et de ses ressources (UICN), M. Duncan Poore Directeur-général.



# UNESCO

UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION

## CONVENTION CONCERNING THE PROTECTION OF THE WORLD CULTURAL AND NATURAL HERITAGE

ADOPTED BY THE GENERAL CONFERENCE AT ITS 17TH SESSION  
PARIS, 16 NOVEMBER 1972



The General Conference of the United Nations Educational, Scientific and Cultural Organization meeting in Paris from 17 October to 21 November 1972, at its seventeenth session,

Noting that the cultural heritage and the natural heritage are increasingly threatened with destruction not only by the traditional causes of decay, but also by changing social and economic conditions which aggravate the situation with even more formidable phenomena of damage or destruction,

Considering that deterioration or disappearance of any item of the cultural or natural heritage constitutes a harmful impoverishment of the heritage of all the nations of the world,

Considering that protection of this heritage at the national level often remains incomplete because of the scale of the resources which it requires and of the insufficient economic, scientific and technical resources of the country where the property to be protected is situated,

Recalling that the Constitution of the Organization provides that it will maintain, increase and diffuse knowledge, by assuring the conservation and protection of the world's heritage, and recommending to the nations concerned the necessary international conventions,

Considering that the existing international conventions, recommendations and resolutions concerning cultural and natural property demonstrate the importance, for all the peoples of the world, of safeguarding this unique and irreplaceable property, to whatever people it may belong,

Considering that parts of the cultural or natural heritage are of outstanding interest and therefore need to be preserved as part of the world heritage of mankind as a whole,

Considering that, in view of the magnitude and gravity of the new dangers threatening them, it is incumbent on the international community as a whole to participate in the protection of the cultural and natural heritage of outstanding universal value, by the granting of collective assistance which, although not taking the place of action by the State concerned, will serve as an effective complement thereto,

Considering that it is essential for this purpose to adopt new provisions in the form of a convention establishing an effective system of collective protection of the cultural and natu-

ral heritage of outstanding universal value, organized on a permanent basis and in accordance with modern scientific methods,

Having decided, at its sixteenth session, that this question should be made the subject of an international convention,

Adopts this sixteenth day of November 1972 this Convention.

## I. DEFINITIONS OF THE CULTURAL AND THE NATURAL HERITAGE

**ARTICLE 1.** For the purposes of this Convention, the following shall be considered as "cultural heritage":

- monuments: architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science;
- groups of buildings: groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science; sites; works of man or the combined works of nature and of man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological points of view.

**ARTICLE 2.** For the purposes of this Convention, the following shall be considered as "natural heritage":

- natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view;
- geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation;
- natural sites or precisely delineated natural areas of outstand-

ing universal value from the point of view of science, conservation or natural beauty.

**ARTICLE 3.** It is for each State party to this Convention to identify and delineate the different properties situated on its territory mentioned in Articles 1 and 2 above.

## II. NATIONAL PROTECTION AND INTERNATIONAL PROTECTION OF THE CULTURAL AND NATURAL HERITAGE

**ARTICLE 4.** Each State Party to this Convention recognizes that the duty of ensuring the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage referred to in Articles 1 and 2 and situated on its territory, belongs primarily to that State. It will do all it can to this end, to the utmost of its own resources and, where appropriate, with any international assistance and co-operation, in particular, financial, artistic, scientific and technical, which it may be able to obtain.

**ARTICLE 5.** To ensure that effective and active measures are taken for the protection, conservation and presentation of the cultural and natural heritage situated on its territory, each State Party to this Convention shall endeavour, in so far as possible, and as appropriate for each country:

- (a) to adopt a general policy which aims to give the cultural and natural heritage a function in the life of the community and to integrate the protection of that heritage into comprehensive planning programmes;
- (b) to set up within its territories, which such services do not exist, one or more services for the protection, conservation and presentation of the cultural and natural heritage with an appropriate staff and possessing the means to discharge their functions;
- (c) to develop scientific and technical studies and research and to work out such operating methods as will make the State capable of counteracting the dangers that threaten its cultural or natural heritage;
- (d) to take the appropriate legal, scientific, technical, administrative and financial measures necessary for the

identification, protection, conservation, presentation and rehabilitation of this heritage; and

- (e) to foster the establishment or development of national or regional centres for training in the protection, conservation and presentation of the cultural and natural heritage and to encourage scientific research in this field.

### ARTICLE 6.

1. Whilst fully respecting the sovereignty of the States on whose territory the cultural and natural heritage mentioned in Articles 1 and 2 is situated, and without prejudice to property rights provided by national legislation, the States Parties to this Convention recognize that such heritage constitutes a world heritage for whose protection it is the duty of the international community as a whole to co-operate.
2. The States Parties undertaken, in accordance with the provisions of this Convention, to give their help in the identification, protection, conservation and preservation of the cultural and natural heritage referred to in paragraphs 2 and 4 of Article 11 if the States on whose territory it is situated so request.
3. Each State Party to this Convention undertakes not to take any deliberate measures which might damage directly or indirectly the cultural and natural heritage referred to in Articles 1 and 2 situated on the territory of other States Parties to this Convention.

**ARTICLE 7.** For the purpose of this Convention, international protection of the world cultural and natural heritage shall be understood to mean the establishment of a system of international co-operation and assistance designed to support States Parties to the Convention in their efforts to conserve and identify that heritage.

### III. INTERGOVERNMENTAL COMMITTEE FOR THE PROTECTION OF THE WORLD CULTURAL AND NATURAL HERITAGE

#### ARTICLE 8.

1. An Intergovernmental Committee for the Protection of the Cultural and Natural Heritage of Outstanding Universal Value, called "the World Heritage Committee", is hereby established within the United Nations Educational, Scientific and Cultural Organization. It shall be composed of 15 States Parties to the Convention, elected by States Parties to the Convention meeting in general assembly during the ordinary session of the General Conference of the United Nations Educational, Scientific and Cultural organization. The number of States members of the Committee shall be increased to 21 as from the date of the ordinary session of the General Conference following the entry into force of this Convention for at least 40 States.
2. Election of members of the Committee shall ensure an equitable representation of the different regions and cultures of the world.
3. A representative of the International Centre for the Study of the Preservation and Restoration of Cultural Property (Rome Centre), a representative of the International Council of Monuments and Sites (ICOMOS) and a representative of the International Union for Conservation of Nature and Natural Resources (IUCN), to whom may be added, at the request of States Parties to the Convention meeting in general assembly during the ordinary sessions of the General Conference of the United Nations Educational, Scientific and Cultural Organization, representatives of other intergovernmental or non-governmental organizations, with similar objectives, may attend the meetings of the Committee in an advisory capacity.

#### ARTICLE 9.

1. The term of office of States members of the World Heritage Committee shall extend from the end of the ordinary session of the General Conference during which they are elected until the end of its third subsequent ordinary session.
2. The term of office of one-third of the members designated at the time of the first election shall, however, cease at the

end of the first ordinary session of the General Conference following that at which they were elected; and the term of office of a further third of the members designated at the same time shall cease at the end of the second ordinary session of the General Conference following that at which they were elected. The names of these members shall be chosen by lot by the President of the General Conference of the United Nations Educational, Scientific and Cultural Organization after the first election.

3. States members of the Committee shall choose as their representatives persons qualified in the field of the cultural or natural heritage.

#### ARTICLE 10.

1. The World Heritage Committee shall adopt its Rules of Procedure.
2. The Committee may at any time invite public or private organizations or individuals to participate in its meetings for consultation on particular problems.
3. The Committee may create such consultative bodies as it deems necessary for the performance of its functions.

#### ARTICLE 11.

1. Every State Party to this Convention shall, in so far as possible, submit to the World Heritage Committee an inventory of property forming part of the cultural and natural heritage, situated in its territory and suitable for inclusion in the list provided for in paragraph 2 of this Article. This inventory, which shall not be considered exhaustive, shall include documentation about the location of the property in question and its significance.
2. On the basis of the inventories submitted by States in accordance with paragraph 1, the Committee shall establish, keep up to date and publish, under the title of "World Heritage List", a list of properties forming part of the cultural heritage and natural heritage, as defined in Articles 1 and 2 of this Convention, which it considers as having outstanding universal value in terms of such criteria as it shall have established. An updated list shall be distributed at least every two years.
3. The inclusion of a property in the World Heritage List requires the consent of the State concerned. The inclusion of a property situated in a territory, sovereignty or jurisdiction

over which is claimed by more than one State shall in no way prejudice the rights of the parties to the dispute.

4. The Committee shall establish, keep up to date and publish, whenever circumstances shall so require, under the title of "List of World Heritage in Danger", a list of the property appearing in the World Heritage List for the conservation of which major operations are necessary and for which assistance has been requested under this Convention. This list shall contain an estimate of the cost of such operations. The list may include only such property forming part of the cultural and natural heritage as is threatened by serious and specific dangers, such as the threat of disappearance caused by accelerated deterioration, large-scale public or private projects or rapid urban or tourist development projects; destruction caused by changes in the use of ownership of the land; major alterations due to unknown causes; abandonment for any reason whatsoever; the outbreak or the threat of an armed conflict; calamities and cataclysms; serious fires, earthquakes, landslides; volcanic eruptions; changes in water level, floods, and tidal waves. The Committee may at any time, in case of urgent need, make a new entry in the List of World Heritage in Danger and publicize such entry immediately.
5. The Committee shall define the criteria on the basis of which a property belonging to the cultural or natural heritage may be included in either of the lists mentioned in paragraphs 2 and 4 of this article.
6. Before refusing a request for inclusion in one of the two lists mentioned in paragraphs 2 and 4 of this article, the Committee shall consult the State Party in whose territory the cultural or natural property in question is situated.
7. The Committee shall, with the agreement of the States concerned, co-ordinate and encourage the studies and research needed for the drawing up of the lists referred to in paragraphs 2 and 4 of this article.

**ARTICLE 12.** The fact that a property belonging to the cultural or natural heritage has not been included in either of the two lists mentioned in paragraphs 2 and 4 of Article 11 shall in no way be construed to mean that it does not have an outstanding universal value for purposes other than those resulting from inclusion in these lists.

#### ARTICLE 13.

1. The World Heritage Committee shall receive and study requests for international assistance formulated by States Parties to this Convention with respect to property forming part of the cultural or natural heritage, situated in their territories, and included or potentially suitable for inclusion in the lists referred to in paragraphs 2 and 4 of Article 11. The purpose of such requests may be to secure the protection, conservation, presentation or rehabilitation of such property.
2. Requests for international assistance under paragraph 1 of this article may also be concerned with identification of cultural or natural property defined in Articles 1 and 2, when preliminary investigations have shown that further inquiries would be justified.
3. The Committee shall decide on the action to be taken with regard to these requests, determine where appropriate, the nature and extent of its assistance, and authorize the conclusion, on its behalf, of the necessary arrangements with the government concerned.
4. The Committee shall determine an order of priorities for its operations. It shall in so doing bear in mind the respective importance for the world cultural and natural heritage of the property requiring protection, the need to give international assistance to the property most representative of a natural environment or of the genius and the history of the peoples of the world, the urgency of the work to be done, the resources available to the States on whose territory the threatened property is situated and in particular the extent to which they are able to safeguard such property by their own means.
5. The Committee shall draw up, keep up to date and publicize a list of property for which international assistance has been granted.
6. The Committee shall decide on the use of the resources of the Fund established under Article 15 of this Convention. It shall seek ways of increasing these resources and shall take all useful steps to this end.
7. The Committee shall co-operate with international and national governmental and non-governmental organizations having objectives similar to those of this Convention. For the implementation of its programmes and projects, the Committee may call on such organizations, particularly the



International Centre for the Study of the Preservation and Restoration of Cultural Property (the Rome Centre), the International Council of Monuments and Sites (ICOMOS) and the International Union for Conservation of Nature and Natural Resources (IUCN), as well as on public and private bodies and individuals.

8. Decisions of the Committee shall be taken by a majority of two-thirds of its members present and voting. A majority of the members of the Committee shall constitute a quorum.

#### ARTICLE 14.

1. The World Heritage Committee shall be assisted by a Secretariat appointed by the Director-General of the United Nations Educational, Scientific and Cultural Organization.
2. The Director-General of the United Nations Educational, Scientific and Cultural Organization, utilizing to the fullest extent possible the services of the International Centre for the Study of the Preservation and the Restoration of Cultural Property (the Rome Centre), the International Council of Monuments and Sites (ICOMOS) and the International Union for Conservation of Nature and Natural Resources (IUCN) in their respective areas of competence and capability, shall prepare the Committee's documentation and the agenda of its meetings and shall have the responsibility for the implementation of its decisions.

### IV. FUND FOR THE PROTECTION OF THE WORLD CULTURAL AND NATURAL HERITAGE

#### ARTICLE 15.

1. A Fund for the Protection of the World Cultural and Natural Heritage of Outstanding Universal Value, called "the World Heritage Fund" is hereby established.
2. The Fund shall constitute a trust fund, in conformity with the provisions of the Financial Regulations of the United Nations Educational, Scientific and Cultural Organization.
3. The resources of the Fund shall consist of:
  - (a) compulsory and voluntary contributions made by the

States Parties to this Convention;

- (b) contributions, gifts or bequests which may be made by:

- (i) other States;

- (ii) the United Nations Educational, Scientific and Cultural Organization, other organizations of the United Nations system, particularly the United Nations Development Programme or other intergovernmental organizations;

- (iii) public or private bodies or individuals;

- (c) any interest due on the resources of the Fund;

- (d) funds raised by collections and receipts from events organized for the benefit of the Fund; and

- (e) all other resources authorized by the Fund's regulations, as drawn up by the World Heritage Committee.

4. Contributions to the Fund and other forms of assistance made available to the Committee may be used only for such purposes as the Committee shall define. The Committee may accept contributions to be used only for a certain programme or project, provided that the Committee shall have decided on the implementation of such programme or project. No political conditions may be attached to contributions made to the Fund.

#### ARTICLE 16.

1. Without prejudice to any supplementary voluntary contribution, the States Parties to this Convention undertake to pay regularly, every two years, to the World Heritage Fund, contributions the amount of which, in the form of a uniform percentage applicable to all States, shall be determined by the General Assembly of States Parties to the Convention, meeting during the sessions of the General Conference of the United Nations Educational, Scientific and Cultural Organization. This decision of the General Assembly requires the majority of the States Parties present and voting, which have not made the declaration referred to in paragraph 2 of this Article. In no case shall the compulsory contribution of States Parties to the Convention exceed 1% of the contribution to the Regular Budget of the United Nations Educational, Scientific and Cultural Organization.

2. However, each State referred to in Article 31 or in Article 32 of this Convention may declare, at the time of the deposit of its instruments of ratification, acceptance or accession, that it shall not be bound by the provisions of paragraph 1 of this Article.
3. A State Party to the Convention which has made the declaration referred to in paragraph 2 of this Article may at any time withdraw the said declaration by notifying the Director-General of the United Nations Educational, Scientific and Cultural Organization. However, the withdrawal of the declaration shall not take effect in regard to the compulsory contribution due by the State until the date of the subsequent General Assembly of States Parties to the Convention.
4. In order that the Committee may be able to plan its operations effectively, the contributions of States Parties to this Convention which have made the declaration referred to in paragraph 2 of this Article, shall be paid on a regular basis, at least every two years, and should not be less than the contributions which they should have paid if they had been bound by the provisions of paragraph 1 of this Article.
5. Any State Party to the Convention which is in arrears with the payment of its compulsory or voluntary contribution for the current year and the calendar year immediately preceding it shall not be eligible as a Member of the World Heritage Committee, although this provision shall not apply to the first election.

The terms of office of any such State which is already a member of the Committee shall terminate at the time of the elections provided for in Article 8, paragraph 1 of this convention.

**ARTICLE 17.** The States Parties to this Convention shall consider or encourage the establishment of national, public and private foundations or associations whose purpose is to invite donations for the protection of the cultural and natural heritage as defined in Articles 1 and 2 of this Convention.

**ARTICLE 18.** The States Parties to this Convention shall give their assistance to international fund-raising campaigns organized for the World Heritage Fund under the auspices of the United Nations Educational, Scientific and Cultural Organization. They shall facilitate collections made by the bodies mentioned in paragraph 3 of Article 15 for this purpose.

## V. CONDITIONS AND ARRANGEMENTS FOR INTERNATIONAL ASSISTANCE

**ARTICLE 19.** Any State Party to this Convention may request international assistance for property forming part of the cultural or natural heritage of outstanding universal value situated within its territory. It shall submit with its request such information and documentation provided for in Article 21 as it has in its possession and as will enable the Committee to come to a decision.

**ARTICLE 20.** Subject to the provisions of paragraph 2 of Article 13, sub-paragraph (c) of Article 22 and Article 23, international assistance provided for by this Convention may be granted only to property forming part of the cultural and natural heritage which the World Heritage Committee has decided, or may decide, to enter in one of the lists mentioned in paragraphs 2 and 4 of Article 11.

### ARTICLE 21.

1. The World Heritage Committee shall define the procedure by which requests to it for international assistance shall be considered and shall specify the content of the request, which should define the operation contemplated, the work that is necessary, the expected cost thereof, the degree of urgency and the reasons why the resources of the State requesting assistance do not allow it to meet all the expenses. Such requests must be supported by experts' reports whenever possible.
2. Requests based upon disasters or natural calamities should, by reasons of the urgent work which they may involve, be given immediate, priority consideration by the Committee, which should have a reserve fund at its disposal against such contingencies.
3. Before coming to a decision, the Committee shall carry out such studies and consultations as it deems necessary.

**ARTICLE 22.** Assistance granted by the World Heritage Committee may take the following forms:

- (a) studies concerning the artistic, scientific and technical problems raised by the protection, conservation, presentation and rehabilitation of the cultural and natural heritage, as defined in paragraphs 2 and 4 of Article 11 of this Convention;

- (b) provision of experts, technicians and skilled labour to ensure that the approved work is correctly carried out;
- (c) training of staff and specialists at all levels in the field of identification, protection, conservation, presentation and rehabilitation of the cultural and natural heritage;
- (d) supply of equipment which the State concerned does not possess or is not in a position to acquire;
- (e) low-interest or interest-free loans which might be repayable on a long-term basis;
- (f) the granting, in exceptional cases and for special reasons, of non-repayable subsidies.

**ARTICLE 23.** The World Heritage Committee may also provide international assistance to national or regional centres for the training of staff and specialists at all levels in the field of identification, protection, conservation, presentation and rehabilitation of the cultural and natural heritage.

**ARTICLE 24.** International assistance on a large scale shall be preceded by detailed scientific, economic and technical studies. These studies shall draw upon the most advanced techniques for the protection, conservation, presentation and rehabilitation of the natural and cultural heritage and shall be consistent with the objectives of this Convention. The studies shall also seek means of making rational use of the resources available in the State concerned.

**ARTICLE 25.** As a general rule, only part of the cost of work necessary shall be borne by the international community. The contribution of the State benefiting from international assistance shall constitute a substantial share of the resources devoted to each programme or project, unless its resources do not permit this.

**ARTICLE 26.** The World Heritage Committee and the recipient State shall define in the agreement they conclude the conditions in which a programme or project for which international assistance under the terms of this Convention is provided, shall be carried out. It shall be the responsibility of the State receiving such international assistance to continue to protect, conserve and present the property so safeguarded, in observance of the conditions laid down by the agreement.

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## VI. EDUCATIONAL PROGRAMMES

### ARTICLE 27.

1. The States Parties to this Convention shall endeavour by all appropriate means, and in particular by educational and information programmes, to strengthen appreciation and respect by their peoples of the cultural and natural heritage defined in Articles 1 and 2 of the Convention.
2. They shall undertake to keep the public broadly informed of the dangers threatening this heritage and of activities carried on in pursuance of this Convention.

**ARTICLE 28.** States Parties to this Convention which receive international assistance under the Convention shall take appropriate measures to make known the importance of the property for which assistance has been received and the role played by such assistance.

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## VII. REPORTS

### ARTICLE 29.

1. The States Parties to this Convention shall, in the reports which they submit to the General Conference of the United Nations Educational, Scientific and Cultural Organization on dates and in a manner to be determined by it, give information on the legislative and administrative provisions which they have adopted and other action which they have taken for the application of this Convention, together with details of the experience acquired in this field.
2. These reports shall be brought to the attention of the World Heritage Committee.
3. The Committee shall submit a report on its activities at each of the ordinary sessions of the General Conference of the United Nations Educational, Scientific and Cultural Organization.

## VIII. FINAL CLAUSES

**ARTICLE 30.** This Convention is drawn up in Arabic, English, French, Russian and Spanish, the five texts being equally authoritative.

### ARTICLE 31.

1. This Convention shall be subject to ratification or acceptance by States members of the United Nations Educational, Scientific and Cultural Organization in accordance with their respective constitutional procedures.
2. The instruments of ratification or acceptance shall be deposited with the Director-General of the United Nations Educational, Scientific and Cultural Organization.

### ARTICLE 32.

1. This Convention shall be opened to accession by all States not members of the United Nations Educational, Scientific and Cultural Organization which are invited by the General Conference of the Organization to accede to it.
2. Accession shall be effected by the deposit of an instrument of accession with the Director-General of the United Nations Educational, Scientific and Cultural Organization.

**ARTICLE 33.** This Convention shall enter into force three months after the date of the deposit of the twentieth instrument of ratification, acceptance or accession, but only with respect to those States which have deposited their respective instruments of ratification, acceptance or accession on or before that date. It shall enter into force with respect to any other State three months after the deposit of its instrument of ratification, acceptance or accession.

**ARTICLE 34.** The following provisions shall apply to those States Parties to this Convention which have a federal or non-unitary constitutional system:

- (a) with regard to the provisions of this Convention, the implementation of which comes in the legal jurisdiction of the federal or central legislative power, the obligations of the federal or central government shall be the same as for those States Parties which are not federal States;

- (b) with regard to the provisions of this Convention, the implementation of which comes under the legal jurisdiction of individual constituent States, countries, provinces or cantons that are not obliged by the constitutional system of the federation to take legislative measures, the federal government shall inform the competent authorities of such States, countries, provinces or cantons of the said provisions, with its recommendation for their adoption.

### ARTICLE 35.

1. Each State Party to this Convention may denounce the Convention.
2. The denunciation shall be notified by an instrument in writing, deposited with the Director-General of the United Nations Educational, Scientific and Cultural Organization.
3. The denunciation shall take effect twelve months after the receipt of the instrument of denunciation. It shall not affect the financial obligations of the denouncing State until the date on which the withdrawal takes effect.

**ARTICLE 36.** The Director-General of the United Nations Educational, Scientific and Cultural Organization shall inform the States members of the Organization, the States not members of the Organization which are referred to in Article 32, as well as the United Nations, of the deposit of all the instruments of ratification, acceptance, or accession provided for in Articles 31 and 32, and of the denunciations provided for in Article 35.

### ARTICLE 37.

1. This Convention may be revised by the General Conference of the United Nations Educational, Scientific and Cultural Organization. Any such revision shall, however, bind only the States which shall become Parties to the revising convention.
2. If the General Conference should adopt a new convention revising this Convention in whole or in part, then, unless the new convention otherwise provides, this Convention shall cease to be open to ratification, acceptance or accession, as from the date on which the new revising convention enters into force.

**ARTICLE 38.** In conformity with Article 102 of the Charter of the United Nations, this Convention shall be registered with the Secretariat of the United Nations at the request of the Director-General of the United Nations Educational, Scientific and Cultural Organization.

Done in Paris, this twenty-third of November 1972, in two authentic copies bearing the signature of the President of the seventeenth session of the General Conference and of the Director-General of the United Nations Educational, Scientific and Cultural Organization, which shall be deposited in the archives of the United Nations Educational, Scientific and Cultural Organization, and certified true copies of which shall be delivered to all the States referred to in Article 31 and 32 as well as to the United Nations.



# UNESCO

UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION

## RECOMMENDATION CONCERNING THE PROTECTION, AT NATIONAL LEVEL, OF THE CULTURAL AND NATURAL HERITAGE

ADOPTED BY THE GENERAL CONFERENCE AT ITS 17TH SESSION  
PARIS, 16 NOVEMBER 1972

The General Conference of the United Nations Educational, Scientific and Cultural Organization, meeting in Paris, at its seventeenth session, from 17 October to 21 November 1972,

Considering that, in a society where living conditions are changing at an accelerated pace, it is essential for man's equilibrium and development to preserve for him a fitting setting in which to live, where he will remain in contact with nature and the evidences of civilization bequeathed by past generations, and that, to this end, it is appropriate to give the cultural and natural heritage an active function in community life and to integrate into an overall policy the achievements of our time, the values of the past and the beauty of nature,

Considering that such integration into social and economic life must be one of the fundamental aspects of regional development and national planning at every level,

Considering that particularly serious dangers engendered by new phenomena peculiar to our times are threatening the cultural and natural heritage, which constitute an essential feature of mankind's heritage and a source of enrichment and harmonious development for present and future civilization,

Considering that each item of the cultural and natural heritage is unique and that the disappearance of any one item constitutes a definite loss and an irreversible impoverishment of that heritage,

Considering that every country in whose territory there are components of the cultural and natural heritage has an obligation to safeguard this part of mankind's heritage and to ensure that it is handed down to future generations,

Considering that the study, knowledge and protection of the cultural and natural heritage in the various countries of the world are conducive to mutual understanding among the peoples,

Considering that the cultural and natural heritage forms an harmonious whole, the components of which are indissociable,

Considering that a policy for the protection of the cultural and natural heritage, thought out and formulated in common, is likely to bring about a continuing interaction among Member States and to have a decisive effect on the activities of the United

Nations Education, Scientific and Cultural Organization in this field,

Noting that the General Conference has already adopted international instruments for the protection of the cultural and natural heritage, such as the Recommendation on International Principles Applicable to Archaeological Excavations (1956), the Recommendation concerning the Safeguarding of the Beauty and Character of Landscapes and Sites (1962) and the Recommendation concerning the Preservation of Cultural Property Endangered by Public or Private Works (1968),

Desiring to supplement and extend the application of the standards and principles laid down in such recommendations,

Having before it proposal concerning the protection of the cultural and natural heritage, which question appears on the agenda of the session as item 23,

Having decided, at its sixteenth session, that this question should be made the subject of international regulations, to take the form of a recommendation to Member States,

Adopts this sixteenth day of November 1972, this Recommendation.

## I DEFINITIONS OF THE CULTURAL AND THE NATURAL HERITAGE

1. For the purposes of this Recommendation, the following shall be considered as "cultural heritage":

monuments: architectural works, works of monumental sculpture and painting, including cave dwellings and inscriptions, and elements, groups of elements or structures of special value from the point of view of archaeology, history, art or science;

groups of buildings: groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of special value from the point of view of history, art or science;

sites: topographical areas, the combined works of man and of nature, which are of special value by reason of their beauty or their interest from the archaeological, historical, ethnological or anthropological points of view.

2. For the purposes of this Recommendation, the following shall be considered as "natural heritage":

natural features consisting of physical and biological formations or groups of such formations, which are of special value from the aesthetic or scientific point of view;

geological and physiographical formations and precisely delineated areas which constitute the habitat of species of animals and plants, valuable or threatened, of special value from the point of view of science or conservation;

natural sites or precisely delineated natural areas of special value from the point of view of science, conservation or natural beauty, or in their relation to the combined works of man and of nature.

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## II NATIONAL POLICY

3. In conformity with their jurisdictional and legislative requirements, each State should formulate, develop and apply as far as possible a policy whose principal aim should be to co-ordinate and make use of all scientific, technical, cultural and other resources available to secure the effective protection, conservation and presentation of the cultural and natural heritage.

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## III GENERAL PRINCIPLES

4. The cultural and natural heritage represents wealth, the protection, conservation and presentation of which impose responsibilities on the States in whose territory it is situated, both vis-à-vis the international community as a whole; Member States should take such action as may be necessary to meet these responsibilities.
5. The cultural or natural heritage should be considered in its entirety as a homogeneous whole, comprising not only works of great intrinsic value, but also more modest items that have, with the passage of time, acquired cultural or natural value.
6. None of these works and none of these items should, as a general rule, be dissociated from its environment.
7. As the ultimate purpose of protecting, conserving and pre-

senting the cultural and natural heritage is the development of man, Member States should, as far as possible, direct their work in this field in such a way that the cultural and natural heritage may no longer be regarded as a check on national development but as a determining factor in such development.

8. The protection, conservation and effective presentation of the cultural and natural heritage should be considered as one of the essential aspects of regional development plans, and planning in general, at the national, regional or local level.
9. An active policy for the conservation of the cultural and natural heritage and for giving it a place in community life should be developed. Member States should arrange for concerted action by all the public and private services concerned, with a view to drawing up and applying such a policy. Preventive and corrective measures relating to the cultural and natural heritage should be supplemented by others, designed to give each of the components of this heritage a function which will make it a part of the nation's social, economic, scientific and cultural life for the present and future, compatible with the cultural or natural character of the item in question. Action for the protection of the cultural and natural heritage should take advantage of scientific and technical advances in all branches of study involved in the protection, conservation and presentation of the cultural or natural heritage.
10. Increasingly significant financial resources should, as far as possible, be made available by the public authorities for the safeguarding and presentation of the cultural and natural heritage.
11. The general public of the area should be associated with the measures to be taken for protection and conservation and should be called on for suggestions and help, with particular reference to regard for and surveillance of the cultural and natural heritage. Consideration might also be given to the possibility of financial support from the private sector.

## IV ORGANIZATION OF SERVICES

12. Although their diversity makes it impossible for all Member States to adopt a standard form of organization, certain common criteria should nevertheless be observed.

### SPECIALIZED PUBLIC SERVICES

13. With due regard for the conditions appropriate to each country, Member States should set up in their territory, wherever they do not already exist, one or more specialized public services to be responsible for the efficient discharge of the following functions:
- (a) developing and putting into effect measures of all kinds designed for the protection, conservation and presentation of the country's cultural and natural heritage and for making it an active factor in the life of the community; and primarily, compiling an inventory of the cultural and natural heritage and establishing appropriate documentation services;
  - (b) training and recruiting scientific, technical and administrative staff as required, to be responsible for working out identification, protection, conservation and integration programmes and directing their execution;
  - (c) organizing close co-operation among specialists of various disciplines to study the technical conservation problems of the cultural and natural heritage;
  - (d) using or creating laboratories for the study of all the scientific problems arising in connection with the conservation of the cultural and natural heritage;
  - (e) ensuring that owners or tenants carry out the necessary restoration work and provide for the upkeep of the buildings in the best artistic and technical conditions.

### ADVISORY BODIES

14. The specialized services should work with bodies of experts responsible for giving advice on the preparation of measures relating to the cultural and natural heritage. Such bodies should include experts, representatives of the major preservation societies, and representatives of the administrations concerned.

## CO-OPERATION AMONG THE VARIOUS BODIES

15. The specialized services dealing with the protection, conservation and presentation of the cultural and natural heritage should carry out their work in liaison and on an equal footing with other public services, more particularly those responsible for regional development planning, major public works, the environment, and economic and social planning. Tourist development programmes involving the cultural and natural heritage should be carefully drawn up so as not to impair the intrinsic character and importance of that heritage, and steps should be taken to establish appropriate liaison between the authorities concerned.
16. Continuing co-operation at all levels should be organized among the specialized services whenever large-scale projects are involved, and appropriate co-ordinating arrangements made so that decisions may be taken in concert, taking account of the various interests involved. Provision should be made for joint planning from the start of the studies and machinery developed for the settlement of conflicts.

### COMPETENCE OF CENTRAL, FEDERAL, REGIONAL AND LOCAL BODIES

17. Considering the fact that the problems involved in the protection, conservation and presentation of the cultural and natural heritage are difficult to deal with, calling for special knowledge and sometimes entailing hard choices, and that there are not enough specialized staff available in this field, responsibilities in all matters concerning the devising and execution of protective measures in general should be divided among central or federal and regional or local authorities on the basis of a judicious balance adapted to the situation that exists in each State.

## V PROTECTIVE MEASURES

18. Member States should, as far as possible, take all necessary scientific, technical and administrative, legal and financial measures to ensure the protection of the cultural and natural heritage in their territories. Such measures should be determined in accordance with the legislation and organization of the State.



## SCIENTIFIC AND TECHNICAL MEASURES

19. Member States should arrange for careful and constant maintenance of their cultural and natural heritage in order to avoid having to undertake the costly operations necessitated by its deterioration; for this purpose, they should provide for regular surveillance of the components of their heritage by means of periodic inspections. They should also draw up carefully planned programmes of conservation and presentation work, gradually taking in all the cultural and natural heritage, depending upon the scientific, technical and financial means at their disposal.
20. Any work required should be preceded and accompanied by such thorough studies as its importance may necessitate. Such studies should be carried out in co-operation with or by specialists in all related fields.
21. Member States should investigate effective methods of affording added protection to those components of the cultural and natural heritage that are threatened by unusually serious dangers. Such methods should take account of the interrelated scientific, technical and artistic problems involved and make it possible to determine the treatment to be applied.
22. These components of the cultural and natural heritage should, in addition, be restored, wherever appropriate, to their former use or given a new and more suitable function, provided that their cultural value is not thereby diminished.
23. Any work done on the cultural heritage should aim at preserving its traditional appearance, and protecting it from any new construction or remodeling which might impair the relations of mass or colour between it and its surroundings.
24. The harmony established by time and man between a monument and its surroundings is of the greatest importance and should not, as a general rule, be disturbed or destroyed. The isolation of a monument by demolishing its surroundings should not, as a general rule, be authorized; nor should the moving of a monument be contemplated save as an exceptional means of dealing with a problem, justified by pressing considerations.
25. Member States should take measures to protect their cultural and natural heritage against the possible harmful ef-

fects of the technological developments characteristic of modern civilization. Such measures should be designed to counter the effects of shocks and vibrations caused by machines and vehicles. Measures should also be taken to prevent pollution and guard against natural disasters and calamities, and to provide for the repair of damage to the cultural and natural heritage.

26. Since the circumstances governing the rehabilitation of groups of buildings are not everywhere identical, Member States should provide for a social science inquiry in appropriate cases, in order to ascertain precisely what are the social and cultural needs of the community in which the group of buildings concerned is situated. Any rehabilitation operation should pay special attention to enabling man to work, to develop and to achieve fulfillment in the restored setting.
27. Member States should undertake studies and research on the geology and ecology of items of the natural heritage, such as park, wildlife, refuge or recreation areas, or other equivalent reserves, in order to appreciate their scientific value, to determine the impact of visitor use and to monitor interrelationships so as to avoid serious damage to the heritage and to provide adequate background for the management of the fauna and flora.
28. Member States should keep abreast of advances in transportation, communication, audio-visual techniques, automatic data-processing and other appropriate technology, and of cultural and recreational trends, so that the best possible facilities and services can be provided for scientific study and the enjoyment of the public, appropriate to the purpose of each area, without deterioration of the natural resources.

## ADMINISTRATIVE MEASURES

29. Each Member State should draw up, as soon as possible, an inventory for the protection of its cultural and natural heritage, including items which, without being of outstanding importance, are inseparable from their environment and contribute to its character.
30. The information obtained by such surveys of the cultural and natural heritage should be collected in a suitable form and regularly brought up to date.
31. To ensure that the cultural and natural heritage is effectively recognized at all levels of planning, Member States should



prepare maps and the fullest possible documentation covering the cultural and natural property in question.

32. Member States should give thought to finding suitable uses for groups of historic buildings no longer serving their original purpose.
33. A plan should be prepared for the protection, conservation, presentation and rehabilitation of groups of buildings of historic and artistic interest. It should include peripheral protection belts, lay down the conditions for land use, and specify the buildings to be preserved and the conditions for their preservation. This plan should be incorporated into the overall town and country planning policy for the areas concerned.
34. Rehabilitation plans should specify the uses to which historic buildings are to be put, and the links there are to be between the rehabilitation area and the surrounding urban development. When the designation of a rehabilitation area is under consideration, the local authorities and representatives of the residents of the area should be consulted.
35. Any work that might result in changing the existing state of the buildings in a protected area should be subject to prior authorization by the town and country planning authorities, on the advice of the specialized services responsible for the protection of the cultural and natural heritage.
36. Internal alterations to groups of buildings and the installation of modern conveniences should be allowed if they are needed for the well-being of their occupants and provided they do not drastically alter the real characteristic features of ancient dwellings.
37. Member States should develop short- and long-range plans, based on inventories of their natural heritage, to achieve a system of conservation to meet the needs of their countries.
38. Member States should provide an advisory service to guide non-governmental organizations and owners of land on national conservation policies consistent with the productive use of the land.
39. Member States should develop policies and programmes for restoration of natural areas made derelict by industry, or otherwise despoiled by man's activities.

## LEGAL MEASURES

40. Depending upon their importance, the components of the cultural and natural heritage should be protected, individually or collectively, by legislation or regulations in conformity with the competence and the legal procedures of each country.
41. Measures for protection should be supplemented to the extent necessary by new provisions to promote the conservation of the cultural or natural heritage and to facilitate the presentation of its components. To that end, enforcement of protective measures should apply to individual owners and to public authorities when they are the owners of components of the cultural and natural heritage.
42. No new building should be erected, and no demolition, transformation, modification or deforestation carried out, on any property situated on or in the vicinity of a protected site, if it is likely to affect its appearance, without authorization by the specialized services.
43. Planning legislation to permit industrial development, or public and private works should take into account existing legislation on conservation. The authorities responsible for the protection of the cultural and natural heritage might take steps to expedite the necessary conservation work, either by making financial assistance available to the owner, or by acting in the owner's place and exercising their powers to have the work done, with the possibility of their obtaining reimbursement of that share of the costs which the owner would normally have paid.
44. Where required for the preservation of the property, the public authorities might be empowered to expropriate a protected building or natural site subject to the terms and conditions of domestic legislation.
45. Member States should establish regulations to control bill-posting, neon signs and other kinds of advertisement, commercial signs, camping, the erection of poles, pylons and electricity or telephone cables, the placing of television aerials, all types of vehicular traffic and parking, the placing of indicator panels, street furniture, etc., and, in general, everything connected with the equipment or occupation of property forming part of the cultural and natural heritage.

46. The effects of the measures taken to protect any element of the cultural or natural heritage should continue regardless of changes of ownership. If a protected building or natural site is sold, the purchaser should be informed that it is under protection.
47. Penalties or administrative sanctions should be applicable, in accordance with the laws and constitutional competence of each State, to anyone who wilfully destroys, mutilates or defaces a protected monument, group of buildings or site, or one which is of archaeological, historical or artistic interest. In addition, equipment used in illicit excavation might be subject to confiscation.
48. Penalties or administrative sanctions should be imposed upon those responsible for any other action detrimental to the protection, conservation or presentation of a protected component of the cultural or natural heritage, and should include provision for the restoration of an affected site to its original state in accordance with established scientific and technical standards.
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52. Consideration should be given to indemnifying, if necessary, owners of protected cultural and natural areas for losses they might suffer as a consequence of protective programmes.
53. The financial advantages accorded to private owners should, where appropriate, be dependent on their observance of certain conditions laid down for the benefit of the public, such as their allowing access to parks, gardens and sites, tours through all or parts of natural sites, monuments or groups of buildings, the taking of photographs, etc.
54. Special funds should be set aside in the budgets of public authorities for the protection of the cultural and natural heritage endangered by large-scale public or private works.
55. To increase the financial resources available to them, Member States may set up one or more "Cultural and Natural Heritage Funds", as legally established public agencies, entitled to receive private gifts, donations and bequests, particularly from industrial and commercial firms.

## FINANCIAL MEASURES

49. Central and local authorities should, as far as possible, appropriate, in their budgets, a certain percentage of funds, proportionate to the importance of the protected property forming part of their cultural or natural heritage, for the purposes of maintaining, conserving and presenting protected property of which they are the owners, and of contributing financially to such work carried out on other protected property by the owners, whether public bodies or private persons.
50. The expenditure incurred in protecting, conserving and presenting items of the privately-owned cultural and natural heritage should, so far as possible, be borne by their owners or users.
51. Tax concessions on such expenditures, or grants or loans on favourable terms, could be granted to private owners of protected properties, on condition that they carry out work for the protection, conservation, presentation and rehabilitation of their properties in accordance with approved standards.
52. Tax concessions could also be granted to those making gifts, donations or bequests for the acquisition, restoration or maintenance of specific components of the cultural and natural heritage.
53. In order to facilitate operations for rehabilitation of the natural and cultural heritage, Member States might make special arrangements, particularly by way of loans for renovation and restoration work, and might also make the necessary regulations to avoid price rises caused by real-estate speculation in the areas under consideration.
54. To avoid hardship to the poorer inhabitants consequent on their having to move from rehabilitated buildings or groups of buildings, compensation for rises in rent might be contemplated so as to enable them to keep their accommodation. Such compensation should be temporary and determined on the basis of the income of the parties concerned, so as to enable them to meet the increased costs occasioned by the work carried out.
55. Member States might facilitate the financing of work of any description for the benefit of the cultural and natural heritage, by instituting "Loan Funds", supported by public institutions and private credit establishments, which would be responsible for granting loans to owners at low interest rates and with repayment spread out over a long period.

## VI. EDUCATIONAL AND CULTURAL ACTION

60. Universities, educational establishments at all levels and life-long education establishments should organize regular courses, lectures, seminars, etc., on the history of art, architecture, the environment and town planning.
61. Member States should undertake educational campaigns to arouse widespread public interest in, and respect for, the cultural and natural heritage. Continuing efforts should be made to inform the public about what is being and can be done to protect the cultural or natural heritage and to inculcate appreciation and respect for the values it enshrines. For this purpose, all media of information should be employed as required.
62. Without overlooking the great economic and social value of the cultural and natural heritage, measures should be taken to promote and reinforce the eminent cultural and educational value of that heritage, furnishing as it does the fundamental motive for protecting, conserving and presenting it.
63. All efforts on behalf of components of the cultural and natural heritage should take account of the cultural and educational value inherent in them as representative of an environment, a form of architecture or urban design commensurate with man and on his scale.
64. Voluntary organizations should be set up to encourage national and local authorities to make full use of their powers with regard to protection, to afford them support and, if necessary, to obtain funds for them; these bodies should keep in touch with local historical societies, amenity improvement societies, local development committees and agencies concerned with tourism, etc., and might also organize visits to, and guided tours of, different items of the cultural and natural heritage for their members.
65. Information centres, museums or exhibitions might be set up to explain the work being carried out on components of the cultural and natural heritage scheduled for rehabilitation.

## VII. INTERNATIONAL CO-OPERATION

66. Member States should co-operate with regard to the protection, conservation and presentation of the cultural and natural

heritage, seeking aid, if it seems desirable, from international organizations, both intergovernmental and non-governmental. Such multilateral or bilateral co-operation should be carefully co-ordinated and should take the form of measures such as the following:

- (a) exchange of information and of scientific and technical publications;
- (b) organization of seminars and working parties on particular subjects;
- (c) provision of study and travel fellowships, and of scientific, technical and administrative staff, and equipment;
- (d) provision of facilities for scientific and technical training abroad, by allowing your research workers and technicians to take part in architectural projects, archaeological excavations and the conservation of natural sites;
- (e) co-ordination, within a group of Member States, of large-scale projects involving conservation, excavations, restoration and rehabilitation work, with the object of making the experience gained generally available.

*The foregoing is the authentic text of the Recommendation duly adopted by the General Conference of the United Nations Educational, Scientific and Cultural Organization during its seventeenth session, which was held in Paris and declared closed the twenty-first day of November 1972.*

*IN FAITH WHEREOF we have appended our signatures this twenty-third day of November 1972.*

*The President of the General Conference*  
TORU HAGUIWARA

*The Director-General*  
RENE MAHEU

*Certified copy*  
Paris,

*Director, Office of International  
Standards and Legal Affairs,  
United Nations Educational,  
Scientific and Cultural Organization*

# ICOMOS

INTERNATIONAL COUNCIL ON MONUMENTS AND SITES

## CHARTER FOR THE CONSERVATION OF HISTORIC TOWNS AND URBAN AREAS

ADOPTED BY ICOMOS, OCTOBER 1987



## PREAMBLE AND DEFINITIONS

All urban communities, whether they have developed gradually over time or have been created deliberately, are an expression of the diversity of societies throughout history.

This charter concerns historic urban areas, large and small, including cities, towns and historic centres or quarters, together with their natural and man-made environment. Beyond their role as historical documents, these areas embody the values of traditional urban cultures. Today many such areas are being threatened, physically degraded, damaged or even destroyed by the impact of the urban development that follows industrialization in societies everywhere.

Faced with this dramatic situation which often leads to irreversible cultural, social and even economic losses, the International Council on Monuments and Sites (ICOMOS) deems it necessary to draw up an international charter for historic towns and urban areas that will complement the "International Charter for the Conservation and Restoration of Monuments and Sites", usually referred to as "The Venice Charter". This new text defines the principles, objectives and methods necessary for the conservation of historic towns and urban areas. It also seeks to promote the harmony of both private and community life in these areas and to encourage the preservation of those cultural properties, however modest in scale, that constitute the memory of mankind.

As set out in the UNESCO "Recommendation concerning the Safeguarding and Contemporary Role of Historic Areas" (Warsaw-Nairobi, 1976) and also in various other international instruments, "the conservation of historic towns and urban areas" is understood to mean those steps necessary for the protection, conservation and restoration of such towns and areas as well as their development and harmonious adaptation to contemporary life.

## PRINCIPLES AND OBJECTIVES

1. In order to be most effective, the conservation of historic towns and other historic development and of urban and regional planning at every level.
2. Qualities to be preserved include the historic character of the town or urban area and all those material and spiritual elements that express this character, especially:
  - a) urban patterns as defined by lots and streets;
  - b) relationships between buildings and green and open spaces;

- c) the formal appearance, interior and exterior, of buildings as defined by scale, size, style, construction materials, colour and decoration;
- d) the relationship between the town or urban area and its surrounding setting, both natural and man-made;
- e) the various functions that the town or urban area has acquired over time.

Any threat to these qualities would compromise the authenticity of the historic town or urban area.

3. The participation and the involvement of the residents are essential to the success of the conservation programme and should be encouraged. The conservation of historic towns and urban area concerns their residents first of all.
4. Conservation in an historic town or urban area demands prudence, a systematic approach and discipline. Rigidity should be avoided since individual cases may present specific problems.

## METHODS AND INSTRUMENTS

5. Planning for the conservation of historic towns and urban areas should be preceded by multidisciplinary studies.

Conservation plans must address all relevant factors including archaeology, history, architecture, techniques, sociology and economics.

The principal objectives of the conservation plan should be clearly stated as should the legal, administrative and financial measures necessary to attain them.

The conservation plan should aim at ensuring a harmonious relationship between the historic urban areas and the town as a whole.

The conservation plan should determine which buildings must be preserved, which should be preserved under certain circumstances and which, under quite exceptional circumstances, might be expendable. Before any intervention, existing conditions in the area should be thoroughly documented.

The conservation plan should be supported by the residents of the historic area.

6. Until a conservation plan has been adopted, any necessary conservation activity should be carried out in accordance with the principles and the aims of this Charter and the Venice Charter.

7. Continuing maintenance is crucial to the effective conservation of a historic town or urban area.

8. New functions and activities should be compatible with the character of the historic town or urban area.

Adaptation of these areas to contemporary life requires the careful installation of improvement of public service facilities.

9. The improvement of housing should be one of the basic objectives of conservation.

10. When it is necessary to construct new buildings or adapt existing ones, the existing spatial layout should be respected, especially in terms of scale and lot size.

The introduction of contemporary elements in harmony with the surroundings should not be discouraged since such features can contribute to the enrichment of an area.

11. Knowledge of the history of a historic town or urban area should be expanded through archaeological investigation and appropriate presentation of archaeological findings.

12. Traffic inside a historic town or urban area must be controlled and parking areas must be planned so that they do not damage the historic fabric or its environment.

13. When urban or regional planning provides for the construction of major motorways, they must not penetrate an historic town or urban area, but they should improve access to them.

14. Historic towns should be protected against natural disasters and nuisances such as pollution and vibration in order to safeguard the heritage and for the security and well-being of the residents.

Whatever the nature of a disaster affecting an historic town or urban area, preventive and repair measures must be adapted to the specific character of the properties concerned.

15. In order to encourage their participation and involvement a general information programme should be set up for all residents, beginning with children of school age.

The action of associations for the protection of heritage should also be encouraged and financial measures in favour of conservation and restoration should be adopted.

16. Specialized training should be provided for all those professions concerned with conservation.



# ICOMOS

INTERNATIONAL COUNCIL ON MONUMENTS AND SITES

## INTERNATIONAL CHARTER FOR ARCHAEOLOGICAL HERITAGE MANAGEMENT

ADOPTED BY ICOMOS IN 1990



## INTRODUCTION

It is widely recognized that a knowledge and understanding of the origins and development of human societies is of fundamental importance to humanity in identifying its cultural and social roots. The archaeological heritage constitutes the basic record of past human activities. Its protection and proper management is therefore essential to enable archaeologists and other scholars to study and interpret it on behalf of and for the benefit of present and future generations.

The protection of this heritage cannot be based upon the application of archaeological techniques alone. It requires a wider basis of professional and scientific knowledge and skills. Some elements of the archaeological heritage are components of architectural structures and in such cases must be protected in accordance with the criteria for the protection of such structures laid down in the 1966 Venice Charter on the Conservation and Restoration of Monuments and Sites. Other elements of the archaeological heritage constitute part of the living traditions of indigenous peoples and for such sites and monuments the participation of local cultural groups is essential to their protection and preservation.

For these and other reasons the protection of the archaeological heritage must be based upon effective collaboration among professionals from many disciplines. It also requires the cooperation of government authorities, academic researchers, private enterprise and the general public. This charter therefore lays down principles relating to the different aspects of archaeological heritage management. These include the responsibilities of public authorities and legislators, principles relating to the professional performance of the process of inventORIZATION, survey, excavation, documentation, research, maintenance, conservation, preservation, reconstruction, information, presentation, public access and use of the heritage and the qualification of professionals involved in the protection of the archaeological heritage.

The charter has been inspired by the success of the Venice Charter as guidelines and a source of ideas for policies and practice of governments as well as scholars and professionals.

The charter has to reflect very basic principles and guidelines with global validity. For this reason it cannot take into account the specific problems and possibilities of regions or countries. The charter should therefore be supplemented at regional and national levels by further principles and guidelines for these needs.

**ARTICLE 1: Definition and Introduction.** The archaeological heritage is that part of the material heritage in re-

spect of which archaeological methods provide primary information. It comprises all vestiges of human existence and consists of places relating to all manifestations of human activity, abandoned structures and remains of all kinds (including subterranean and underwater sites), together with all the portable cultural material associated with them.

**ARTICLE 2: Integrated Protection Policies.** The archaeological heritage is a fragile and non-renewable cultural resource. Land use must therefore be controlled and developed in order to minimize the destruction of the archaeological heritage.

Policies for the protection of the archaeological heritage should constitute an integral component of policies relating to land use, development and planning as well as of cultural, environment and educational policies. The creation of archaeological reserves should form part of such policies.

The protection of the archaeological heritage should be integrated into planning policies at international, national, regional and local levels.

Active participation by the general public must form part of policies for the protection of the archaeological heritage. This is essential where the heritage of indigenous peoples is involved. Participation must be based upon access to the knowledge necessary for decision-making. The provision of information for the general public is therefore an important element in integrated protection.

**ARTICLE 3: Legislation and Economy.** The protection of the archaeological heritage should be considered as a moral obligation upon all human beings; it is also a collective public responsibility. This obligation must be acknowledged through relevant legislation and the provision of adequate funds for the supporting programmes necessary for effective heritage management.

The archaeological heritage is common to all human society and it should therefore be the duty of every country to ensure that adequate funds are available for its protection.

Legislation should afford protection to the archaeological heritage that is appropriate to the needs, history and traditions of each country and region, providing for in situ protection and research needs.

Legislation should be based on the concept of the archaeological heritage as the heritage of all humanity and of groups of peoples and not restricted to any individual person or nation.

Legislation should forbid the destruction, degradation or alteration through changes of any archaeological site or monument or to their surroundings without the consent of the relevant archaeological authority.

Legislation should in principle require full archaeological investigation and documentation in cases where the destruction of the archaeological heritage is authorized.

Legislation should require and make provision for the proper maintenance and conservation of the archaeological heritage.

Adequate legal sanctions should be prescribed in respect of violations of archaeological heritage legislation.

If legislation affords protection only to those elements of the archaeological heritage which are registered in a selective statutory inventory, provision should be made for the temporary protection of unprotected or newly discovered sites and monuments until an archaeological evaluation can be carried out.

Development projects constitute one of the greatest physical threats to the archaeological heritage. A duty for developers to ensure that archaeological heritage impact studies are carried out before development schemes are implemented, should therefore be embodied in appropriate legislation, with a stipulation that the costs of such studies are to be included in projects costs. The principle should also be established in legislation that development schemes should be designed in such a way as to minimize their impact upon the archaeological heritage.

**ARTICLE 4: Survey.** The protection of the archaeological heritage must be based upon the fullest possible knowledge of its extent and nature. General survey of archaeological resources is therefore an essential working tool in developing strategies for the protection of the archaeological heritage. Consequently archaeological survey should be a basic obligation in the protection and management of the archaeological heritage.

At the same time, inventories constitute primary resource data bases for scientific study and research. The compilation of inventories should therefore be regarded as a continuous, dynamic process. It follows that inventories should comprise information at various levels of significance and reliability, since even superficial knowledge can form the starting point for protectional measures.

**ARTICLE 5: Investigation.** Archaeological knowledge is based principally on the scientific investigation of the archaeological heritage. Such investigation embraces the whole range of methods from non-destructive techniques through sampling to total excavation.

It must be an over-riding principle that the gathering of information about the archaeological heritage should not destroy any more archaeological evidence than is necessary for the protectional or scientific objectives of the investigation.

Non-destructive techniques, aerial and ground survey and sampling should therefore be encouraged wherever possible, in preference to total excavation.

As excavation always implies the necessity of making a selection of evidence to be documented and preserved at the cost of losing other information and possibly even the total destruction of the monument, a decision to excavate should only be taken after thorough consideration.

Excavation should be carried out on sites and monuments threatened by development, land-use change, looting or natural deterioration.

In exceptional cases, unthreatened sites may be excavated to elucidate research problems or to interpret them more effectively for the purpose of presenting them to the public. In such cases excavation must be preceded by thorough scientific evaluation of the significance of the site. Excavation should be partial, leaving a proportion undisturbed for future research.

A report conforming to an agreed standard should be made available to the scientific community and should be incorporated in the relevant inventory within a reasonable period after the conclusions of the excavation.

Excavations should be conducted in accordance with the principles embodied in the 1956 UNESCO Recommendations on International Principles Applicable to Archaeological Excavations and with agreed international and national professional standards.

**ARTICLE 6: Maintenance and Conservation.** The overall objective of archaeological heritage management should be the preservation of monuments and sites in situ. Any transfer of elements of the heritage to new locations represents a violation of the principles of preserving the heritage in its original context. This principle stresses the need for proper maintenance, conservation and management. It also asserts the principle that the archaeological heritage should not be exposed by excavation or left exposed after excavation if provision for its proper maintenance and management after excavation cannot be guaranteed.

Local commitment and participation should be actively sought and encouraged as a means of promoting the maintenance of the archaeological heritage. This principle is especially important when dealing with the heritage of indigenous peoples or local cultural groups. In some cases it may be appropriate to entrust responsibility for the protection and management of sites and monuments to indigenous peoples.

Owing to the inevitable limitations of available resources, active maintenance will have to be carried out on a selective

basis. It should therefore be applied to a sample of the diversity of sites and monuments, based upon scientific assessment of their significance and representative character and not confined to the more notable and visually attractive monuments.

The relevant principles of the 1956 UNESCO Recommendations should be applied in respect of the maintenance and conservation of the archaeological heritage.

#### **ARTICLE 7: Presentation, Information, Reconstruction.**

The presentation of the archaeological heritage to the general public is an essential method of promoting an understanding of the origins and development of modern societies. At the same time it is the most important means of promoting an understanding of the needs for its protection.

Presentation and information should be conceived as a popular interpretation of the current state of knowledge and it must therefore be revised frequently. It should take account of the multi-faceted approaches to an understanding of the past.

Reconstruction serves two important functions: experimental research and interpretation. They should, however, be carried out with great caution, so as to avoid disturbing any surviving archaeological evidence and they should take account of evidence from all sources in order to achieve authenticity. Where possible and appropriate, reconstruction should not be built immediately on the archaeological remains and should be identifiable as such.

**ARTICLE 8: Professional Qualifications.** High academic standards in many different disciplines are essential to the management of the archaeological heritage. The training of an adequate number of qualified professionals in the relevant fields of expertise should therefore be an important objective for the educational policies in every country. The need to develop expertise in certain highly specialized fields calls for international cooperation.

The objective of academic archaeological training should take account of the shift in conservation policies from excavation to in situ preservation. It should also take into account the fact that the study of the history of indigenous peoples is as important to preserving and understanding the archaeological heritage as the study of outstanding monuments and sites.

The protection of the archaeological heritage is a process of continuous dynamic development. Time should therefore be made available to professionals working in this field to enable them to update their knowledge. Postgraduate training programmes should be developed with special emphasis on the protection and management of the archaeological heritage.

**ARTICLE 9: International Cooperation.** The archaeological heritage is the common heritage of all humanity. International cooperation is therefore essential in developing and maintaining standards in its management.

There is an urgent need to create international mechanisms for the exchange of information and experience among professionals dealing with archaeological heritage management. This requires the organization of conferences, seminars, workshops, etc. at global as well as regional levels and the establishment of regional centres for postgraduate studies. ICOMOS, through its specialized groups, should promote this aspect in its medium and long-term planning.

International exchanges of professional staff should also be developed as a means of raising standards of archaeological heritage management.

Technical assistance programmes in the field of archaeological heritage management should be developed under the auspices of ICOMOS.

# ICOMOS

INTERNATIONAL COUNCIL ON MONUMENTS AND SITES

INTERNATIONAL COMMITTEE  
ON HISTORIC GARDENS AND SITES

ICOMOS-IFLA

Florence Charter  
(21 May 1981)



## PREAMBLE

The ICOMOS-IFLA International Committee for Historic Gardens, meeting in Florence on 21 May 1981, decided to draw up a charter on the preservation of historic gardens which would bear the name of that town. The present Charter was drafted by the Committee, and registered by ICOMOS on 15 December 1982 as an addendum to the Venice Charter covering the specific field concerned.

## DEFINITIONS AND OBJECTIVES

**ARTICLE 1.** "An historic garden is an architectural and horticultural composition of interest to the public from the historical or artistic point of view" As such, it is to be considered as a monument.

**ARTICLE 2.** "The historic garden is an architectural composition whose constituents are primarily horticultural and therefore alive, which means that they are perishable and renewable."

Thus its appearance is the reflection of a perpetual equilibrium between the cyclic movement of the seasons and of the development and decay of nature and the will of the artist and artificer seeking to keep it permanently unchanged.

**ARTICLE 3.** As a monument, the historic garden must be preserved in accordance with the spirit of the Venice Charter. However, since it is a LIVE MONUMENT, its preservation must be governed by specific rules which are the subject of the present Charter.

**ARTICLE 4.** The architectural composition of the historic garden embraces:

- its plan and the shape of any portions in relief
- its beds of plants, including their species, proportions,
- colour schemes, spacing and respective heights
- its permanent structures or decorative features
- its running or still waters, in which the sky is reflected.

**ARTICLE 5.** As the expression of the closeness of the bond between civilization and nature, and as a place of enjoyment suited to meditation or musing, the garden thus acquires the cosmic significance of an idealized image of the world, a

"paradise" in the etymological sense of the term, and yet a testimony to a culture, a style, an age and perhaps also the originality of a creative artist.

**ARTICLE 6.** The term "historic garden" is applicable alike to unpretentious small gardens and to large-scale pleasure gardens, whether of the formal or of the "landscape" type.

**ARTICLE 7.** Whether or not it is associated with a building - with which it will in that case form an indissociable whole - the historic garden cannot be isolated from its own peculiar environment, whether urban or rural, artificial or natural.

**ARTICLE 8.** An historic landscape is a specific landscape which, for example, is associated with a memorable happening, a major historical event, a well-known myth or an epic combat, or is the subject of a famous picture.

**ARTICLE 9.** If historic gardens are to be preserved they must be identified and inventoried. They demand care of various different kinds, namely, maintenance, conservation and restoration. In certain cases actual reconstruction may be recommended. The AUTHENTICITY of a historic garden is as much a matter of the design and proportions of its various parts as of its decorative features or of the choice of plant or inorganic materials adopted for each part of it.

## MAINTENANCE, CONSERVATION, RESTORATION, RECONSTRUCTION

**ARTICLE 10.** In any work of maintenance, conservation, restoration or reconstruction of a historic garden, or of any part of it, all the elements composing it must be dealt with simultaneously. To isolate the various operations would be to damage the unity of the whole.

## MAINTENANCE AND CONSERVATION

**ARTICLE 11.** Maintenance in the case of historic gardens is an operation of paramount importance which must necessarily be continuous. Since the principal material consists of the plants, the preservation of the garden in an unchanged condition will involve both individual replacements whenever required and a long-term programme of periodic renewal (complete felling followed by replanting with sufficiently mature specimens).



**ARTICLE 12.** Those species of trees, shrubs, plants and flowers which are to be periodically replanted must be selected in the light of established and recognized practice in each botanical and horticultural area, the aim being to determine the species initially grown and to preserve them.

**ARTICLE 13.** The permanent or movable architectural, sculptural or decorative features which form an integral part of the historic garden must be removed or displaced only insofar as this is essential for their conservation or restoration. The replacement or restoration of any such works which are in jeopardy must be effected in accordance with the principles of the Venice Charter and the date of any complete replacement must be indicated.

**ARTICLE 14.** The historic garden must be preserved in surroundings that are appropriate. Any alteration to the physical environment which will endanger the ecological equilibrium must be prohibited. These regulations are applicable to all aspects of the infrastructure, whether internal or external (drainage works, irrigation systems, roads, car parks, fences, caretaking facilities, visitors' amenities, etc.).

**ARTICLE 15.** No restoration work and, above all, no reconstruction work on a historic garden shall be undertaken without thorough prior research which will ensure that such work is scientifically performed and which will involve everything from excavation to the assembling of records relating to the garden in question and to similar gardens. Before any practical work starts, a project must be prepared on the basis of the said research and must be submitted to a group of experts for joint examination and approval.

**ARTICLE 16.** In restoration work due allowance must be made for the successive stages in the evolution of the garden concerned. In principle, no one period should be given precedence over any other, unless in exceptional cases where the degree of decay or destruction affecting certain parts of a garden may be such that it is decided to reconstruct it on the basis of the traces that survive or of unimpeachable documentary evidence. Such reconstruction work might be undertaken more particularly on the parts of the garden nearest to the building it contains in order to bring out their significance in the design.

**ARTICLE 17.** Where a garden has completely disappeared or there exists no more than conjectural evidence of its successive aspects, there can be no question of seeking to reconstruct anything in the nature of a historic garden.

A work inspired by traditional forms, laid out in such circumstances on the site of a former garden, or a site where none had ever existed, would belong merely to the realm of reminiscence of original creation and could in no case be classed as a historic garden.

**ARTICLE 18.** While any historic garden is designed to be seen and walked about in, access to it must be restricted to the extent demanded by its size and vulnerability so that its physical fabric and cultural message may be preserved.

**ARTICLE 19.** By reason of its nature and purpose an historic garden is a peaceful place conducive to human contacts, silence and the turning of a sensitive ear to nature. This conception of its everyday use must contrast with its role on those rare occasions where it accommodates a festivity. Thus the conditions of such occasional use of an historic garden should be clearly determined, in order that any such festivity may itself serve to enhance the visual effect of the garden instead of perverting or damaging it.

**ARTICLE 20.** Though gardens may be suitably able to accommodate quiet games as a daily occurrence, separate areas should also be laid out side by side with historic gardens in which active and lively games and sports may be practiced, so that the needs of the public may be satisfied in this respect without prejudice to the conservation of the gardens and landscapes.

**ARTICLE 21.** The work of maintenance and conservation, the timing of which is determined by season, and the brief operations which serve to restore the garden's authenticity, must always take precedence over the requirements of practical use. The arrangements for any visiting of a historic garden must be subject to regulations ensuring that the spirit of the place is preserved.

**ARTICLE 22.** If a garden is walled, its walls may not be removed without prior examination of all the possible consequences liable to lead to changes in its atmosphere and to affect its preservation.

## LEGAL AND ADMINISTRATIVE PROTECTION

**ARTICLE 23.** It is the task of the responsible authorities to adopt, on the advice of the experts competent in the matter, the appropriate legal and administrative measures for the identification, inventorying and protection of historic gardens. The preservation of such gardens must be provided for within

the framework of land-use plans and such provision must be duly mentioned in documents relating to regional and local planning. It is also the task of the responsible authorities to adopt, on the advice of the competent experts, the financial measures which will facilitate the maintenance, conservation and restoration and, where necessary, the reconstruction, of historic gardens.

**ARTICLE 24.** An historic garden is one of the features of the heritage whose survival, by reason of its nature, requires the greatest amount of continuous attention on the part of qualified persons. Suitable educational provision should therefore be available for the training of such persons whether historians, architects, landscape architects, gardeners or botanists.

Care should also be taken to ensure that there is regular production of the plant varieties called for each case.

**ARTICLE 25.** Interest in historic gardens should be stimulated by every kind of activity capable of emphasizing their true value as part of the heritage and making for improved knowledge and appreciation of them, namely, promotion of scientific research, the international exchange and circulation of information, publications including works designed for the general public, the encouragement of public access under suitable control and use of the media to develop awareness of the need for due respect for nature and for the historic heritage. The most outstanding of the historic gardens shall be proposed for inclusion on the World Heritage List.

***Nota Bene:** The above recommendations are applicable to all the gardens of the world. Additional clauses applicable to specific types of garden may be subsequently appended to the present Charter with brief descriptions of the said types.*

# ICOMOS

CARTA DE PETROPOLIS

FIRST BRAZILIAN SEMINAR ABOUT THE PRESERVATION  
AND REVITALIZATION OF HISTORIC CENTRES

ICOMOS BRAZILIAN COMMITTEE, ITAIPAVA, JULY 1987

## BASIC PRINCIPLES

1. Urban historical sites may be considered as those spaces where manifold evidences of the city's cultural production concentrate. They are to be circumscribed rather in terms of their operational value as "critical areas" than in opposition to the city's non- historical places, since the city in its totality is a historical entity.
2. Urban historical sites are part of a wider totality, comprising the natural and the built environment and the everyday living experience of their dwellers as well. Within this wider space, enriched with values of remote or recent origin and permanently undergoing a dynamic process of successive transformations, new urban spaces may be considered as environmental evidences in their formative stages.
3. As a socially produced cultural expression the city adds rather than subtracts. Built space, thus, is the physical result of a social productive process. Its replacement is not justified unless its socio-cultural potentialities are proven exhausted. Evaluation standards for replacement convenience should take into account the socio-cultural costs of the new environment.
4. The main purpose of preservation is the maintenance and enhancement of reference patterns needed for the expression and consolidation of citizenship. It is through the outlook of the citizen's political appropriation of urban space that preservation may contribute to improve life quality.
5. Considering that one of the characteristics of urban historical sites is their manifold functions, their preservation should not take place at the expense of severe use limitations, even when the allowed uses are of the kind referred to as cultural. They should, in fact, necessarily shelter both the universes of work and of everyday life, through which the more authentic expressions of society's heterogeneity and plurality are brought out. Concerning this heterogeneity, and taking into account the evident housing shortage in Brazil, housing should be the main function of built space. Consequently, the permanence of residents and of traditional activities in urban historical sites, when compatible with those sites, deserves special attention.
6. The preservation of urban historical sites must be one of the basic aims of urban planning, seen as a continuous and permanent process, supported by a proper understanding of those mechanisms that generate and influence the formation of spatial structures.
7. The preservation of urban historical sites demands the integrated action of federal, state and local entities, and also the participation of the community concerned with planning decisions as part of the full exercise of citizenship. In this sense it is essential to favor and encourage institutional mechanisms assuring a democratic management of the city through a strengthened participation of civilian leadership.
8. Within the preservation process of urban historical sites and as part of the analysis and evaluation of prevailing conditions, inventories are basic tools leading to a better knowledge of cultural and natural property. The participation of the community in inventorying is revealing as to the value it attaches to the property relevant and stimulates its concern as regards such property.
9. Legal protection of urban historical sites is to be achieved through different procedures, such as cataloging, inventorying, urbanistic regulations, tax exemptions and incentives, listing as to cultural interest and expropriation.
10. Accompanying the diversification of protective procedures, it is essential that the social value of urban property be made to prevail over its market value.

# **THE BURRA CHARTER**

THE AUSTRALIA ICOMOS CHARTER FOR THE CONSERVATION  
OF PLACES OF CULTURAL SIGNIFICANCE

ADOPTED BY AUSTRALIA ICOMOS, FEBRUARY 23, 1981



## EXPLANATORY NOTES

These notes in italics do not form part of the Charter and may be added to by Australia ICOMOS

## PREAMBLE

Having regard to the International Charter for the Conservation and Restoration of Monuments and Sites (Venice 1966), and the Resolutions of the 5th General Assembly of ICOMOS (Moscow 1978), the following Charter has been adopted by Australia ICOMOS.

## DEFINITIONS

**ARTICLE 1.** For the purpose of this Charter:

- 1.1 Place means site, area, building or other work, group of buildings or other works together with pertinent contents and surroundings. *Place includes structures, ruins, archaeological sites and areas.*
- 1.2 Cultural significance means aesthetic, historic, scientific or social value for past, present or future generations.
- 1.3 Fabric means all the physical material of the place.
- 1.4 Conservation means all the processes of looking after a place so as to retain its cultural significance. It includes maintenance and may according to circumstance include preservation, restoration, reconstruction and adaptation and will be commonly a combination of more than one of those.
- 1.5 Maintenance means the continuous protective care of the fabric, contents and setting of a place, and is to be distinguished from repair. Repair involves restoration or reconstruction and it should be treated accordingly. *The distinctions for example in relation to roof gutters, are:*
  - *maintenance - regular inspection and cleaning of gutters*
  - *repair involving restoration - returning of dislodged gutters to their place*
  - *repair involving reconstruction - replacing decayed gutters*

1.6 Preservation means maintaining the fabric of a place in its existing state and retarding deterioration.

1.7 Restoration means returning the EXISTING fabric of a place to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material.

1.8 Reconstruction means returning a place as nearly as possible to a known earlier state and is distinguished by the introduction of materials (new or old) into the fabric. This is not to be confused with either re-creation or conjectural reconstruction which are outside the scope of this Charter.

1.9 Adaptation means modifying a place to suit proposed compatible uses.

1.10 Compatible use means a use which involves no change to the culturally significant fabric, changes which are substantially reversible, or changes which require a minimal impact.

## CONSERVATION PRINCIPLES

**ARTICLE 2.** The aim of conservation is to retain or recover the cultural significance of a place and must include provision for its security, its maintenance and its future. *Conservation should not be undertaken unless adequate resources are available to ensure that the fabric is not left in a vulnerable state and that the cultural significance of the place is not impaired. However, it must be emphasized that the best conservation often involves the least work and can be inexpensive.*

**ARTICLE 3.** Conservation is based on a respect for the existing fabric and should involve the least possible physical intervention. It should not distort the evidence provided by the fabric. *The traces of additions, alterations and earlier treatments on the fabric of a place are evidence of its history and uses. Conservation action should tend to assist rather than to impede their interpretation.*

**ARTICLE 4.** Conservation should make use of all the disciplines which can contribute to the study and safeguarding of a place. Techniques employed should be traditional but in some circumstances they may be modern ones for which a firm scientific basis exists and which have been supported by a body of experience.

**ARTICLE 5.** Conservation of a place should take into consideration all aspects of its cultural significance without unwarranted emphasis on any one at the expense of others. Words in *italics* are defined in Article 1.

**ARTICLE 6.** The conservation policy appropriate to a place must first be determined by an understanding of its cultural significance and its physical condition.

**ARTICLE 7.** The conservation policy will determine which uses are compatible.

**ARTICLE 8.** Conservation requires the maintenance of an appropriate visual setting, e.g. form, scale, colour, texture and materials. No new construction, demolition or modification which would adversely affect the setting should be allowed. Environmental intrusions which adversely affect appreciation or enjoyment of the place should be excluded. *New construction work, including infill and additions, may be acceptable provided:*

- *it does not reduce or obscure the cultural significance of the place*
- *it is in keeping with Article 8.*

**ARTICLE 9.** A building or work should remain in its historical location. The moving of all or part of a building or work is unacceptable unless this is the sole means of ensuring its survival. *Some structures were designed to be readily removable or already have a history of previous moves, e.g. prefabricated dwellings are poppet-heads. Provided such a structure does not have a strong association with its present site its removal may be considered.*

*If any structure is moved it should be moved to an appropriate setting and given an appropriate use. Such action should not be to the detriment of any place of cultural significance.*

**ARTICLE 10.** The removal of contents which form part of the cultural significance of the place is unacceptable unless it is the sole means of ensuring their security and preservation. Such contents must be returned should changed circumstances make this practicable.

## CONSERVATION PROCESSES

### Preservation

**ARTICLE 11.** Preservation is appropriate where the existing state of the fabric itself constitutes evidence of specific cultural significance, or where insufficient evidence is available to allow other conservation processes to be carried out. *Preservation protects fabric without obscuring the evidence of its construction and use.*

*The process should always be applied:*

- *where the evidence of the fabric is of such significance that it must not be altered. This is an unusual case and likely to be appropriate for archaeological remains of national importance*
- *where insufficient investigation has been carried out to permit conservation policy decisions to be taken in accord with Articles 23 to 25.*

*New construction may be carried out in association with preservation when its purpose is the physical protection of the fabric and when it is consistent with Article 8.*

**ARTICLE 12.** Preservation is limited to the protection, maintenance and where necessary, the stabilization of the existing fabric but without the distortion of its cultural significance. *Stabilization is a process which helps keep fabric intact and in a fixed position. When carried out as a part of preservation work it does not introduce new materials into the fabric. However, when necessary for the survival of the fabric, stabilization may be effected as part of a reconstruction process and new materials introduced. For example, grouting or the insertion of a reinforcing rod in a masonry wall.*

### Restoration

**ARTICLE 13.** Restoration is appropriate only if there is sufficient evidence of an earlier state of the fabric and only if returning the fabric to that state recovers the cultural significance of the place. *See explanatory note for Article 2.*

**ARTICLE 14.** Restoration should reveal anew culturally significant aspects of the place. It is based on respect for all the physical, documentary and other evidence and stops at the point where conjecture begins.

**ARTICLE 15.** Restoration is limited to the reassembling of displaced components or removal of accretions in accordance with Article 16.

**ARTICLE 16.** The contributions of all periods to the place must be respected. If a place includes the fabric of different periods, revealing the fabric of one period at the expense of another can only be justified when what is removed is of slight cultural significance and the fabric which is to be revealed is of much greater cultural significance.

### Reconstruction

**ARTICLE 17.** Reconstruction is appropriate where a place is incomplete through damage or alteration and where it is necessary for its survival, or where it recovers the cultural significance of the place as a whole.

**ARTICLE 18.** Reconstruction is limited to the completion of a depleted entity and should not constitute the majority of the fabric of a place.

**ARTICLE 19.** Reconstruction is limited to the reproduction of fabric the form of which is known from physical and/or documentary evidence. It should be identifiable on close inspection as being new work.

### Adaptation

**ARTICLE 20.** Adaptation is acceptable where the conservation of the place cannot otherwise be achieved, and where the adaptation does not substantially detract from its cultural significance.

**ARTICLE 21.** Adaptation must be limited to that which is essential to a use for the place determined in accordance with Articles 6 and 7.

**ARTICLE 22.** Fabric of cultural significance unavoidably removed in the process of adaptation must be kept safely to enable its future reinstatement.

### CONSERVATION PRACTICE

**ARTICLE 23.** Work on a place must be preceded by professionally prepared studies of the physical, documentary and other evidence, and the existing fabric recorded before any disturbance of the place.

**ARTICLE 24.** Study of a place by any disturbance of the fabric or by archaeological excavation should be undertaken where necessary to provide data essential for decisions on the conservation of the place and/or to secure evidence about to be lost or made inaccessible through necessary conservation or other unavoidable action. Investigation of a place for any other reason which requires physical disturbance and which adds substantially to a scientific body of knowledge may be permitted, provided that it is consistent with the conservation policy for the place.

**ARTICLE 25.** A written statement of conservation policy must be professionally prepared setting out the cultural significance, physical condition and proposed conservation process together with justification and supporting evidence including photographs, drawings and all appropriate samples.

**ARTICLE 26.** The organization and individuals responsible for policy decisions must be named and specific responsibility taken for each such decision.

**ARTICLE 27.** Appropriate professional direction and supervision must be maintained at all stages of the work and a log kept of new evidence and additional decisions recorded as in Article 25 above.

**ARTICLE 28.** The records required by Articles 23, 25, 26 and 27 should be placed in a permanent archive and made publicly available.

**ARTICLE 29.** The items referred to in Article 10 and Article 22 should be professionally catalogued and protected.

# DESCHAMBAULT DECLARATION

ADOPTED BY THE CONSEIL DES MONUMENTS ET DES SITES DU QUÉBEC,  
ICOMOS CANADA FRENCH-SPEAKING COMMITTEE, APRIL 1982



## I. WHY THE CHARTER?

The postwar period has witnessed the worldwide spread of various currents of thought that seem to adjust people's way of living to new socio-economic conditions, and to criticize the consequences of industrialization, of urbanization on a massive scale, of progress at all costs, and of the consumer society. Whether extreme or moderate, these ideologies have helped to make people aware of certain human values that merited preservation. These things of value include the architectural, artistic or simply material remains that our predecessors have bequeathed us.

The basic principles of heritage preservation were set forth in the Venice International Charter of 1964, which was signed by experts from many countries. The aim of this charter was to regulate and promote efforts to safeguard national heritages. Subsequently, at Amsterdam and Nairobi, this initial undertaking was further developed by the addition of other basic principles that expressed an increased desire not only to pass on an accumulated heritage, but also to broaden the concept of heritage itself. Henceforth, people wanted to ensure the preservation of all aspects of national heritage.

This movement began to have a noticeable influence on Quebec from 1960 on. The Quebec government's first action in this field was to create a Ministry of Cultural Affairs, which made it possible to pass the Cultural Properties Act in 1972. At that moment, our heritage acquired value in the eyes of the law. However, even before this Act was passed, the community had organized itself into groups that differed in structure, but shared a common desire to become involved in safeguarding their environment and culture, and to develop strategies that would make the different levels of government aware of the issue.

This individual and collective commitment resulted in significant achievements in the areas of preservation, stimulation of community participation, and development. Whether through municipal, provincial or federal programs, large-scale projects or more modest actions, the people of Quebec have shown that they are interested in their heritage and are determined to revive it.

The Conseil des monuments et sites du Québec offers this charter in support of these efforts. The Charter is intended as an orientation guide, a reference tool, a remedy and above all a code of ethics that we should adopt in dealing with our heritage. While this charter draws upon previous experience and on international currents of thought, the principles of preservation and development it contains may be applied by all individuals and organizations that are concerned with the protection of the natural, cultural and historical aspects of the Quebec heritage.

The first aim of this charter, which has been specifically drafted for Quebec, is to try to identify our cultural personality, and thereby define the special nature of our heritage. Secondly, the charter seeks to encourage people to think before they act; and finally, it proposes a framework for action that is positive and objective, that provides incentive, and that takes into account both the particular problems of Quebec and contemporary doctrines of heritage development.

## II. THE QUEBEC CULTURAL CONTEXT

The experience of Quebec is similar to that of other nations in that the specific character of its culture has been determined by its history which has taken place in a particular environment. The main features of this environment are a harsh climate, a vast territory, the relatively recent establishment of a North American civilization that is European in origin, the French fact, Catholicism and a particular pattern of human settlement.

Wrested from the American Indians who were its original inhabitants, Quebec became first a French, then a British colony, and finally a part of the Canadian confederation. Quebec's political history has been marked by the struggle to preserve its French and Catholic roots on a Northern American continent where the majority of the population is and has been English-speaking.

Nevertheless, a variety of elements has contributed to the development of our social fabric. In the course of time, immigrants from different places have been added to the amalgam of the three peoples who originally fought over the territory of Quebec. Sometimes immigration occurred all at once, as in the case of the Loyalists and the Irish; and sometimes it was spread over time, as happened with the Italians and the Chinese. Little by little, the immigrant phenomenon has altered the physiognomy and mentality of Quebec's population.

Our material heritage has been marked not only by this mixture of cultural traits, but also by certain fashions that have had international currency. Of these, the Victorian influence is certainly the most important, but we also find traces of Art Nouveau, the skyscraper era and many other aesthetic or technological vogues.

Economic life, that mainspring of societies, has probably had the greatest impact on the distribution of Quebec's population. From the very beginning, more or less densely populated communities were concentrated in areas that had acquired importance because of the fur trade. Seigniorial estates and English townships provided the framework for the development of



agriculture. Many elements of our society were drawn northward by the forest products and mining industries. Finally, the spectacular growth of the United States had repercussions of the utmost importance on our economic model and our way of life: massive urbanization, high rate of consumption, establishment of large industrial centres and development of means of transportation for natural, human and energy resources.

Many other factors have contributed to the shaping of our image. The preponderance of Catholicism prompted the proliferation of churches and convents and gave rise to an art that was centered on the sacred. The rigors of the climate forced people to make adaptations in every aspect of their way of life. As for the distribution of population, it was for the most part determined by the waterways of the St. Lawrence basin.

It would be pointless to offer here an exhaustive list of all the geographical, social, historical and economic factors that have contributed to the development of our cultural fabric. Suffice it to say that this ferment of ideas, habits and customs, taking place as it did in a particular geographic context, has given rise to traditions, a folklore, a mentality, ways of doing things, and architecture, a social structure and, in sum, an art of living that is uniquely Québécois. Though the elements that make up this culture have not all been integrated to the same degree, nor in the same way, their importance cannot be doubted. They constitute our heritage, which is nourished and strengthened by the past, and continues to flourish in the lives of the present generations. We cannot allow this dynamic growth to be cut off from its roots.

### III. THE SITUATION TODAY

We felt the need to publish this charter because all too often our heritage is threatened, when it is not forgotten or destroyed. This problem, of course, is not peculiar to Quebec. Modernization and the pursuit of new lifestyles have, in fact, relentlessly imperiled national heritages everywhere. Such is the price of progress!

In Quebec, the great distances between population centres and the immensity of the territory have led to a more or less integrated development. All these factors have been unfavorable to the preservation of our national heritage. Consequently, we must show greater vigilance, enhance dialogue and consultation, and do more to mobilize the forces of the community.

The climate is also, at times, a menace to our architectural heritage and to the remains of former times. Frost, especially combined with thawing, has a serious effect on buildings

in Quebec. Rapid and technologically competent action is necessary in this area.

Finally, our European and Northern American cultural heritage is threatened by a danger that is less perceptible but not less real than the others. Because this culture is of recent origin and only extends over a short span of time, it would be inappropriate to rely solely on chronological classification to determine the relative value of its different elements. One should not, for example, attribute greater value to the remains of the 18th century than to those of the 19th. Of course, the older things are, one must use subtlety in judging these matters.

### IV. DEFINITION OF HERITAGE AND PRESERVATION

Heritage is defined as "the combined creations and products of nature and of man, in their entirety, that make up the environment in which we live in space and time.

Heritage is a reality, a possession of the community, and a rich inheritance that may be passed on, which invites our recognition and our participation."

(Quebec Association for the Interpretation of the National Heritage, Committee on Terminology, July 1980).

The concept of heritage as defined above is intended to cover much more than buildings erected in a more or less distant past. Neither in the past nor in the future is heritage limited in time. We use the heritage of yesterday to build the heritage of tomorrow, for culture is by its very nature dynamic and is constantly being renewed and enriched.

Heritage, in our view, is a very comprehensive term that includes three major entities: material culture (cultural properties) and the geographic and human environments. People are, of course, most familiar with the concept of cultural properties since these are defined by law. We should remember, however, that in addition to formal and popular architecture, these properties include all other forms of material evidence, such as archaeological and ethnographical objects, iconography, written archives, furniture, art objects and, in sum, the whole of the material environment in which we live. The geographical environment is nature as it manifests itself on the territory of Quebec in coast, mountain and plain. We wish to insist above all on the great importance of our landscapes and our natural sites, which have a unique esthetic and/or panoramic value. And let us note, finally, that the people in their environment, who have their own customs and traditions, whose memory is furnished with a particular folklore, and whose way of living is adapted to this spec-

cific setting, are a human and social treasure that also requires protection.

This broad definition of our national heritage includes, then, all the elements of our civilization, as they exist not only individually but also as components of larger historical, cultural and traditional unities or, to put it in simpler terms, as examples of man's adaptation to his environment. This concept of heritage includes the idea of a cultural landscape which may be defined as the result of the interaction of human society and nature. Preservation of the national heritage may be viewed, in this light, as that combination of study, expertise and physical intervention which aims at conserving every element of this heritage in the best possible condition. This activity involves proper maintenance, consolidation, repair, safeguarding and restoration, to prevent the deterioration and, at worst, the destruction of the national heritage.

**ARTICLE 1.** The citizens of Quebec are the foremost protectors of the national heritage.

**ARTICLE 1-A.** The citizens of Quebec have, in the first place, an individual responsibility to protect their heritage. They must do all they can to appreciate its value, to strive to understand its full significance, and to contribute to its preservation.

**ARTICLE 1-B.** This individual responsibility must also find expression in every decision that is made on behalf of the community, whether by elected representatives or by corporate or institutional managers.

**ARTICLE 2.** The national heritage is a treasure that belongs to the community. It is precious and non-renewable.

**ARTICLE 2-A.** The national heritage must be preserved, safeguarded and developed for the benefit of present and future generations. This treasure does not belong to us; it has been entrusted to us so that we may pass it on to others. We must ensure its proper use and conservation.

**ARTICLE 2-B.** All the laws and regulations as well as the fiscal, financial and administrative mechanisms in their entirety must further the preservation and development of the national heritage. This action must start at the municipal level, for the municipalities are the primary legal representatives of the community.

**ARTICLE 2-C.** The national heritage must remain in the possession of the people of Quebec, and it must be recognized that cultural properties belong in their place of origin.

**ARTICLE 2-D.** The greatest possible attention must be paid to authenticity in preserving and developing the national heritage, and in passing it on to future generations. When only certain elements of this heritage remain, these must be treated as integral wholes. Any action taken must be comprehensible and reversible.

**ARTICLE 3.** Knowledge of the national heritage is an essential prerequisite for its preservation.

**ARTICLE 3-A.** All the appropriate means for acquiring this knowledge must be provided. In particular, we must have up-to-date inventories and the specialized expertise that is required before any action can be taken.

**ARTICLE 4.** The national heritage must enjoy public and unconditional recognition.

**ARTICLE 4-A.** Interdisciplinary teams must assess the cultural, historical, natural, social and esthetic importance of our heritage on the national, regional and local levels.

**ARTICLE 4-B.** Represent must be shown for the significant contributions of every historical period.

**ARTICLE 5.** The preservation of the national heritage requires maintenance, protection and development.

**ARTICLE 5-A.** Protection of our national heritage must be ensured, in the first place, by ongoing maintenance.

**ARTICLE 5-B.** The development of cultural properties is of essential importance. This development includes all measures that serve to make them accessible and useful, and that, if necessary, make it possible to reintroduce them into the daily life of the people of Quebec.

**ARTICLE 5-C.** Every action to preserve the national heritage should be designed to conserve as much as possible of the original, and to avoid reconstruction based on conjecture.

**ARTICLE 5-D.** The development of cultural properties should be followed up by the dissemination of that practical knowledge that is required for passing on these properties to future generations and ensuring their permanent protection.

**ARTICLE 6.** The national heritage must be given priority in all areas.

**ARTICLE 6-A.** Legislation affecting the national heritage must take precedence over all other legislation.

**ARTICLE 6-B.** The principles of protection and development of the national heritage must have primacy in all development plans.

**ARTICLE 6-C.** When the importance, for our heritage, of a building or group of buildings or landscapes has been recognized, these must take precedence over the rest of the environment. This consideration must be a decisive factor in any alteration of that environment, and the adaptation, integration and respect of the heritage material must be ensured.

**ARTICLE 6-D.** Any contemporary additions, which must be creative works in their own right, have to be integrated and harmonized with the surrounding context in regard to tonality, texture, proportions, pattern of filled and empty spaces, and overall composition.

It must not be forgotten that an archaeological analysis of all ground where new construction is planned is absolutely essential, to uncover the earlier remains of construction and habitation and, where necessary, to examine the possibilities of conservation in site.

**ARTICLE 7.** The public has a legitimate right to participate in any decision in regard to actions to preserve the national heritage.

**ARTICLE 7-A.** At all times, those who may become involved in actions to preserve our heritage have a responsibility to disseminate information on that heritage, to implement procedures ensuring the circulation of ideas, to further community participation, and to promote the preservation of our heritage.

**ARTICLE 7-B.** When the national heritage is affected by a particular action, those responsible for that action must consult with the citizens and inform them of the scope of that action.

Documents relating to such actions must be made available to the public and must be prepared in such a way that non-specialists can understand them.

Furthermore, those involved in furthering these actions must develop adequate consultation procedures in order to take note of the opinions of the public. Such procedures will, in particular, include public hearings, information sessions and exhibitions.

**ARTICLE 8.** The revival of our heritage must be compatible with the maintenance, and even the improvement, of its specific identity, integrity and cultural values.

**ARTICLE 8-A.** Our heritage must be employed in such a way as to maintain or introduce functions that are useful to society and that are compatible with the structure and nature of the buildings, spaces and sites of which it is made up. In using our heritage, we must show consideration for its integration into the economic and social activities of the surrounding community.

**ARTICLE 8-B.** We must promote the continuous use of our heritage, without any interruption of occupation.

**ARTICLE 8-C.** Whenever we decide to make new use of heritage material, we must ensure the preservation of all the important characteristics of that material.

Any changes that are made must, at all times, be reversible.

**ARTICLE 8-D.** The selection of a new function for heritage material must avoid excessive use and the deterioration that would result from such use.

**ARTICLE 9.** The preservation of the dynamic and functional character of our heritage is insured by local residents who are an integral part of that heritage and contribute to its protection and its vitality.

**ARTICLE 9-A.** In using our heritage, we must preserve or reintroduce everyday life rather than the artificial life of museums and tourist centres. Preference should be given to traditional occupations; and we must, in any case, respect the needs and legitimate aspirations of the inhabitants, even if this requires us to adopt uses that are different from the original ones.

**ARTICLE 9-B.** In other words, it is necessary to encourage respect for the established rights of the local population.

The housing function should take precedence over all other uses and be given first priority.

**ARTICLE 9-C.** We must preserve and enhance the quality of life in the environments where our heritage monuments, landscapes, remains and complexes are located.

**ARTICLE 10.** Our educational institutions must promote the idea that everyone has to take responsibility for preserving the national heritage.

**ARTICLE 10-A.** Our educational system must disseminate knowledge pertaining to our heritage, to make people aware of its value and of the need to preserve.

**ARTICLE 10-B.** The educational system must ensure that traditions are passed on, and thereby encourage the training of artisans, technicians and professionals who will be able to work to safeguard our heritage.

**ARTICLE 10-C.** Other educational authorities (the family, newspapers and magazines, radio and TV, etc.) must also do their part in furthering heritage education. In particular, heritage practitioners and specialists increase awareness through the communication of their knowledge to the general public.

THE  
**APPLETON CHARTER**  
FOR THE PROTECTION AND ENHANCEMENT OF THE BUILT ENVIRONMENT

PUBLISHED BY  
ICOMOS CANADA  
UNDER THE AUSPICES OF THE ENGLISH-SPEAKING COMMITTEE  
OTTAWA, CANADA  
AUGUST 1983



## A. PREAMBLE

This charter acknowledges The International Charter for the Conservation & Restoration of Monuments & Sites (Venice, 1964), the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (the Burra Charter of February 23, 1981), and the Charter for the Preservation of Quebec's Heritage (Declaration of Deschambault), without which it could not exist.

It further recognizes that the sound management of the built environment is an important cultural activity; and that conservation is an essential component of the management process.

## B. FRAMEWORK

Intervention within the built environment may occur at many levels (from preservation to redevelopment), at many scales (from individual building elements to entire sites), and will be

characterized by one or more activities, ranging from maintenance to addition.

Though any given project may combine intervention scales, levels and activities, projects should be characterized by a clearly stated goal against which small-scale decisions may be measured.

The appropriate level of intervention can only be chosen after careful consideration of the merits of the following:

- cultural significance,
- condition and integrity of the fabric,
- contextual value,
- appropriate use of available physical, social and economic resources.

Decisions concerning the relative importance of these factors must represent as broadly based a consensus as possible.

Legitimate consensus will involve public participation and must precede initiation of work.

The relationship between scales of intervention levels of intervention and intervention activities is summarized below.

ACTIVITY					
Levels of Intervention	Maintenance	Stabilization	Removal	Addition	
PRESERVATION	X	X			
PERIOD RESTORATION	X	X	X		X
REHABILITATION	X	X	X		X
PERIOD RECONSTRUCTION					X
REDEVELOPMENT					X
SCALES OF INTERVENTION					
Levels of Intervention	Building Elements	Buildings	Groups of Buildings	Buildings & Settings	Sites
PRESERVATION	X	X	X	X	X
PERIOD RESTORATION	X	X	X	X	X
REHABILITATION	X	X	X	X	X
PERIOD RECONSTRUCTION	X	X	X	X	X
REDEVELOPMENT	X	X	X	X	X

## LEVELS OF INTERVENTION:

**Preservation:** retention of the existing form, material and integrity of site.

**Period Restoration:** recovery of an earlier form, material and integrity of a site.

**Rehabilitation:** modification of a resource to contemporary functional standards which may involve adaptation for new use.

**Period Reconstruction:** recreation of vanished or irreversibly deteriorated resources.

**Redevelopment:** insertion of contemporary structures or additions sympathetic to the setting.

## ACTIVITIES:

**Maintenance:** continual activity to ensure the longevity of the resource without irreversible or damaging intervention.

**Stabilization:** a periodic activity to halt deterioration and to put the existing form and materials of a site into a state of equilibrium, with minimal change.

**Removal:** a periodic activity: modification which involves the subtraction of surfaces, layers, volumes and/or elements.

**Addition:** a periodic activity: modification which involves the introduction of new material.

**Protection:** Protection may involve stabilization; it must involve a continuing programme of maintenance.

**Artifactual value:** Sites of the highest cultural significance are to be considered primarily as artifacts, demanding protection as fragile and complex historical monuments.

**Setting:** Any element of the built environment is inseparable from the history to which it bears witness, and from the setting in which it occurs. Consequently, all interventions must deal with the whole as well as with the parts.

**Relocation:** Relocation and dismantling of an existing resource should be employed only as a last resort, if protection cannot be achieved by any other means.

**Enhancement:** The activities of removal or addition are characteristic of measures in support of enhancement of the heritage resource.

**Use:** A property should be used for its originally intended purpose. If this is not feasible, every reasonable effort shall be made to provide a compatible use which requires minimal alteration. Consideration of new use should begin with respect for existing and original traditional patterns of movement and layout.

**Additions:** New volumes, materials and finishes may be required to satisfy new uses or requirements. They should echo contemporary ideas but respect and enhance the spirit of the original.

**Environmental Control:** Systems of insulation, environmental control and other servicing should be upgraded in ways which respect the existing and traditional equilibria and do not set in motion processes of deterioration.

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## C. PRINCIPLES

Respect for the existing fabric is fundamental to the activities of protection and enhancement.

The process of protection and enhancement must recognize all interests and have recourse to all fields of expertise which can contribute to the study and safeguarding of a resource.

In intervening at the scales, levels and activities described, measures in support of the protection and enhancement of the built environment will involve adherence to the following principles:

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## D. PRACTICE

**Documentation:** The better a resource is understood and interpreted, the better it will be protected and enhanced.

In order to properly understand and interpret a site, there must be a comprehensive investigation of all those qualities which invest a structure with significance.

This activity must precede activity at the site.

Work on site must itself be documented and recorded.

**Conjecture:** Activities which involve the recovery or recreation of earlier forms must be limited to those forms which can be achieved without conjecture.

**Distinguishability:** New work should be identifiable on close inspection or to the trained eye, but should not impair the aesthetic integrity or coherence of the whole.

**Materials and techniques:** Materials and techniques should respect traditional practice unless modern substitutes for which a firm scientific basis exists, which have been supported by a body of experience and which provide significant advantage can be identified.

**Patina:** Patina forms part of the historic integrity of a resource, and its destruction should be allowed only when essential to the protection of the fabric. Falsification of patina should be avoided.

**Reversibility:** The use of reversible processes is always to be preferred to allow the widest options for future development or the correction of unforeseen problems, or where the integrity of the resource could be affected.

**Integrity:** Structural and technological integrity must be respected and will require attention to performance as well as to appearance.

**IIC / CG**

(DRAFT)

**CODE OF ETHICS  
AND GUIDANCE FOR PRACTICE**

for Those Involved in  
the Conservation of Cultural Property in Canada

INTERNATIONAL INSTITUTE FOR CONSERVATION  
CANADIAN GROUP, OTTAWA, MAY 1985

This document is intended to serve both as a guideline for use by conservators and as an outline of the ethical obligations of conservators for use by their clients, colleagues and employers. It consists of four parts:

1. The Code of Ethics
2. Guidance for Conservation Practice: an interpretation of the principles stated in the Code of Ethics.
3. Glossary of Terms: a list of definitions of terms as they are used in this document. The terms which are included in this glossary are highlighted in the Code of Ethics and the Guidance for Conservation Practice.
4. Bibliography: a list of the principal references consulted by the authors in the writing of this document.

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## CODE OF ETHICS FOR THE PRACTICE OF CONSERVATION OF CULTURAL PROPERTY IN CANADA

Principles of ethical behaviour for all those involved in the conservation of cultural property:

- I. It is the responsibility of the conservator\*, acting alone or with others, to constantly strive to maintain a balance between the cultural needs of society and the preservation\* of cultural property\*.
- II. In the conservation\* of cultural property, all actions of the conservator must be governed by an unswerving respect for the physical, historic and aesthetic integrity of the property.
- III. The conservator shall strive to attain the highest standards in all aspects of conservation, including examination\*, treatment, research, documentation\* and training.
- IV. The conservator shall recognize his or her limitations and the special skills of others.
- V. The conservator has the responsibility of contributing to the evolution and growth of the profession by continuing to develop knowledge and skills and by sharing this information and experience with colleagues.
- VI. The conservator shall respect the integrity of fellow conservators and the conservation profession as a whole.

\* Words that are defined in the Glossary of Terms.

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## GUIDANCE FOR CONSERVATION PRACTICE

### THE CONSERVATOR AND CULTURAL PROPERTY

#### *General Obligations*

1. Shared Responsibility
2. Standard of Treatment
3. Documentation
4. Recognition of Limitations
5. Professional Development

#### *Preventive Conservation*

6. Preventive Conservation

#### *Examination*

7. Examination Record
8. Risks of Examination
9. Sampling

#### *Conservation Treatment*

10. Necessity of Treatment
11. Treatment Proposals
12. Treatment Record
13. Extent of Treatment
14. Techniques and Materials
15. Removal of Material
16. Restoration and Reconstruction

#### *Subsequent Care*

17. Subsequent Care

#### *Emergency Situations*

18. Emergency Situations

#### *Relationship with the Owner*

19. Relationship with the Owner
20. Consent of Owner
21. In Case of Disagreement
22. Treatment Summary

### THE CONSERVATOR AND THE PROFESSION

23. Respect for Fellow Conservators
24. Communication



25. False Information
26. Training
27. Education of Other Professions and the Public
28. Referrals
29. Misuse of Referrals
30. Request for a Second Opinion
31. Delegating and Subcontracting
32. Comments on the Work of Another Conservator
33. References
34. Conflict of Interest
35. Safety

## THE CONSERVATOR AND CULTURAL PROPERTY

### *General Obligations*

#### **1. Shared Responsibility**

The care and treatment of a cultural property is the shared responsibility of the owner and the conservator.

#### **2. Standard of Treatment**

The conservator\* shall adhere to the highest standard of treatment, regardless of any opinion of the value or quality of a cultural property\*. Although circumstances may limit the extent of treatment, the quality of treatment must not be compromised.

#### **3. Documentation\***

The conservator\* has an obligation to document his/her work by recording all details of the conservation\* of a cultural property\*. Examination records\* and treatment records are an intrinsic part of the property; they should be kept in as permanent a manner as is practical and be available for appropriate access.

#### **4. Recognition of Limitations**

The conservator\* shall carry out only that work which is within the limits of his/her professional competence and facilities.

#### **5. Professional Development**

The conservator\* shall strive to improve his/her knowledge and skills through continuous study and communication with conservators and other specialists.

### *Preventive Conservation*

#### **6. Preventive Conservation**

Preventive conservation\* is a primary objective of the conservator and must be considered prior to other forms of intervention. The conservator shall strive to establish and maintain a high standard in conditions of storage, display, use and handling of a cultural property\*

### *Examination*

#### **7. Examination Records\***

The conservator\* shall make a thorough examination of the cultural property\* and prepare an appropriate record before performing any conservation treatment. The conservator should study relevant historical and technical records and where necessary shall initiate analyses of materials. From these records the conservator shall prepare an examination report which shall include details of composition, condition and case history.

#### **8. Risks of Examination**

Before making any examination\* which may result in a change in the cultural property\*, the conservator\* shall establish the necessity for such an examination and receive from the owner\* written permission to proceed.

#### **9. Sampling**

In cases where sample material must be taken from a cultural property\*, prior consent must be obtained from the owner. Only a minimum of sample material necessary shall be removed and the fullest possible record of sample removal shall be kept. Where relevant and with the agreement of the owner\*, material removed from the object should be retained as part of the examination record\*.

### *Conservation Treatment*

#### **10. Necessity for Treatment**

Before the treatment of a cultural property\* is undertaken, the conservator\* shall establish the necessity for such intervention.

#### **11. Treatment Proposal**

On the basis of the examination\*, the conservator\* shall report his/her findings and recommendations to the owner\*, including an estimate of resources required. This is done in order to fully inform the owner and to obtain consent to proceed. Any significant changes to the proposed treatment shall be conveyed to the owner and written consent must be received before the conservator proceeds with the revised treatment.

#### **12. Treatment Record**

The conservator\* shall ensure that a record of techniques and materials used in conservation\* treatments is made and maintained as part of the documentation\* of a cultural property\*. This record shall include justifications and observations as well as any details of composition or condition which have been revealed during treatment.

#### **13. Extent of Treatment**

The conservator\* shall not undertake any treatment which is more extensive than necessary. Conversely, a conservator shall not be negligent by consciously omitting an essential

treatment which could have been carried out.

#### **14. Techniques and Materials**

The conservator\* shall endeavour to use only techniques and materials which, to the best of current knowledge, will not endanger the cultural and physical integrity of the cultural property\*. Ideally, these techniques and materials should not impede future treatment or examination.

Whenever possible, the conservator shall select the techniques which adversely affect or modify the object least and materials which can be removed most easily and completely.

#### **15. Removal of Material**

No aspect of a cultural property\* should be altered nor should material be removed from it without justification. When such removal or alteration is required, those aspects or materials shall first be documented in their existing state. Where relevant and with the agreement of the owner\*, material removed from an object shall be retained as part of the documentation\* of a cultural property.

#### **16. Restoration and Reconstruction**

Restoration\* and reconstruction\* are means of reestablishing the cultural values of a cultural property\*. If undertaken, they shall be: without fraudulent intention, to the minimum extent necessary and fully documented. The conservator\* shall use techniques which affect the cultural perpetuation least and materials which can be most easily and completely removed without hazard to any original part. The presence and extent of restoration or reconstruction must be detectable, though they need not be conspicuous.

#### *Subsequent Care*

#### **17. Subsequent Care**

The conservator\* shall specify to the owner\* the requirements for subsequent care, which may include specifications for shipping and handling, storage, display and maintenance.

#### *Emergency Situations*

#### **18. Emergency Situations**

In an emergency, the conservator\* shall render all assistance practicable with due respect given as far as possible to the guidelines in this document. If a departure from normal practice is necessary, the conservator shall take care to advise the client or appropriate authority and should recommend subsequent actions.

#### *Relationship with the Owner*

#### **19. Relationship with the Owner**

The shared responsibilities of the conservator\* and the owner\* for the care and treatment of a cultural property\* shall be

based on mutual trust and respect, maintained through responsible communication.

#### **20. Consent of Owner**

The written consent of the owner\* must be obtained before any direct intervention is undertaken which may result in a change in the cultural property\*.

#### **21. In case of Disagreement**

Should the conservator\* and the owner\* disagree over a proposed treatment or use of a cultural property\*, they should review the situation, if necessary in consultation with other specialists in the field, to ensure that the nature of the problems and implications of the treatment or use are fully understood. The conservator maintains the right of refusal to undertake any treatment or procedure which he/she considers unethical.

#### **22. Treatment Summary**

Upon completion of treatment, the conservator\* shall provide the owner\* with a summary of the treatment record and shall stress the importance of maintaining this summary as an intrinsic part of the cultural property\*.

### **THE CONSERVATOR AND THE PROFESSION**

#### **23. Respect for Other Conservators**

The conservator\* shall respect the professional integrity of fellow conservators.

#### **24. Communication**

To further the development of the profession, a conservator\* should, where possible, share information gained from research, examination or treatment.

#### **25. False Information**

The conservator\* shall not knowingly be party to the dissemination of false or misleading information relating to cultural property\* or the efficacy or value of conservation\* treatments or materials.

#### **26. Training**

The conservator\* should endeavour to become involved in the instruction of trainees, but only within the limits of his/her knowledge and ability and the time and technical facilities available. The rights and objectives of both the trainer and the trainee should be clearly stated and mutually agreed upon in writing and should include such items as anticipated length of training, areas of competence to be taught and payments.

#### **27. Education of Other Professions and the Public**

The conservator\* shall promote an awareness and understanding of conservation\* through education of fellow profession-

als and the general public. This is best achieved through communication, through personal attitude and by example through a high standard of conservation work.

### 28. Referrals

If the conservator\* lacks the necessary experience or equipment to perform a task, the advice of other professionals should be sought or the owner\* should be referred to a conservator more experienced or better equipped to carry out that particular task.

### 29. Misuse of Referrals

In the case of a referral for consultation or treatment, the conservator\* to whom the client has been referred shall carry out the required work and then unless otherwise intended, shall return the client to the original conservator. A conservator shall not attempt to encroach upon the established clientele of another conservator.

### 30. Request for a Second Opinion

If, for any reason, before or during treatment, the owner\* requests the opinion of another conservator\*, this request shall be respected by the original conservator.

### 31. Delegating and Subcontracting

The conservator\* is directly responsible for delegated or subcontracted work on cultural property\*. This includes work delegated to other conservators, trainees, volunteers, subordinates or other agents. Work shall not be delegated or subcontracted unless the conservator can directly supervise it or has sufficient knowledge of the agent to be sure that the work will be of a high standard.

### 32. Comments on the Work of Another Conservator

The conservator\* shall not volunteer adverse judgment or comment on the work of another conservator, except where non-disclosure will lead to harm befalling the cultural property\*. All comments should be based on facts and personal knowledge rather than hearsay. If such comments are warranted, it is best to first discuss the matter directly with the person concerned; further comment and discussion belong in an appropriate public forum.

### 33. References

The conservator\* shall not recommend or provide a personal reference for a person without having personal knowledge of the training, experience and abilities of that individual.

### 34. Conflict of Interest

The conservator\* shall not enter knowingly into contractual or other working arrangements or agreements which place the conservator in a position of conflict of interest. In the event of uncertainty or dispute, the conservator shall obtain another opinion from appropriate persons before proceeding further with the work in question.

### 35. Safety

The conservator\* shall use techniques and materials in a responsible manner in order to minimize hazards to himself, fellow conservators, the public and the environment.

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## GLOSSARY OF TERMS USED IN THE IIC-CG CODE OF ETHICS AND GUIDANCE FOR CONSERVATION PRACTICE

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**Conservation:** All actions aimed at the safeguarding of cultural property for the future. Its purpose is to study, record, retain and restore the culturally significant qualities of the object with the least possible intervention.

**Conservator:** In general usage, the term “conservator” has several meanings. For the purpose of this document, conservator is used in the generic sense as any person whose primary occupation is the conservation of cultural property and who has the training, knowledge, ability and experience to carry out conservation activities. The term, therefore, includes practicing conservators (who are normally designated according to areas of specialization, e.g., paintings conservator, artifacts conservator, architectural conservator) as well as conservation scientists and conservation technicians.

**Cultural Property:** An object that is judged by society to be of particular historical, artistic or scientific importance. Cultural property can be classified into two major categories:

1. Movable objects: works of art, artifacts, books, manuscripts and other objects of natural, historical or archaeological origin.
2. Immovable objects: monuments of nature, architecture, art or history and archaeological sites and structures of historical or artistic interest.

**Documentation:** All of the records, written and pictorial, accumulated during the examination and treatment of a cultural property; where applicable, it includes the examination record, treatment proposal, owner consent, the treatment record and summary and the recommendations for future use or storage.

**Examination:** All activities carried out to determine the materials, structure and condition of a cultural property, including the extent of deterioration, alteration and loss.

**Examination Record:** Written and pictorial information resulting from the examination, analyses and study of relevant material; this includes samples taken from the cultural property, details of composition, condition, case history and relevant correspondence.

**Owner:** For the purpose of this document, the owner is either:

1. the person(s) having legal ownership of the cultural property or
2. the person who exercises professional custodianship over a cultural property, such as the museum director, curator, archivist or librarian.

**Preservation:** All actions taken to retard deterioration of or prevent damage to cultural property. It involves controlling the environment and conditions of use and may include treatment in order to maintain a cultural property, as nearly as possible, in an unchanging state.

**Preventive Conservation:** All actions taken to retard deterioration and prevent damage to cultural property through the provision of optimal conditions of storage, use and handling.

**Reconstruction:** All actions taken to recreate, in whole or in part, a cultural property based upon historical, literary, graphic, pictorial, archaeological and scientific evidence. Its aim is to promote an understanding of a cultural property and is based on little or no original material but clear evidence of a former state.

**Restoration:** All actions taken to modify the existing materials and structure of a cultural property to represent a known earlier state. Its aim is to preserve and reveal the aesthetic and historic value of a cultural property and it is based on respect for remaining original material and clear evidence of the earlier state.

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**THE SECRETARY OF THE INTERIOR'S  
STANDARDS FOR REHABILITATION  
AND GUIDELINES FOR  
REHABILITATING HISTORIC BUILDINGS**

U.S. DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE,  
PRESERVATION ASSISTANCE DIVISION, WASHINGTON, D.C.



## INTRODUCTION

The Secretary of the Interior is responsible for establishing standards for all programs under Departmental authority and for advising Federal agencies on the preservation of historic properties listed or eligible for listing in the National Register of Historic Places. In partial fulfillment of this responsibility, the Secretary of the Interior's Standards for Historic Preservation Projects have been developed to direct work undertaken on historic buildings. Initially used by the Secretary of the Interior in determining the applicability of proposed project work on registered properties within the Historic Preservation Fund grant-in-aid program, the Standards for Historic Preservation Projects have received extensive testing over the years - more than 6,000 acquisition and development projects were approved for a variety of work treatments. In addition, the Standards responsibilities for properties in Federal ownership or control; and by State and local officials in the review of both Federal and non-federal rehabilitation proposals. They have also been adopted by a number of historic district and planning commissions across the country. **The Standards for Rehabilitation** (36 CFR 67) comprise that section of the overall historic preservation project standards addressing the most prevalent treatment today: Rehabilitation. "Rehabilitation" is defined as "the process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions and features of the property which are significant to its historic, architectural, and cultural values."

Initially developed by the Secretary of the Interior to determine the appropriateness of proposed project work on registered properties within the Historic Preservation Fund grant-in-aid program, the Standards for Rehabilitation have been widely used over the years to determine if a rehabilitation qualifies as a Certified Rehabilitation for Federal tax purposes. In addition, the Standards have guided Federal agencies in carrying out their historic preservation responsibilities for properties in Federal ownership or control; and State and local officials in reviewing both Federal and non-federal rehabilitation proposals. They have also been adopted by historic district and planning commissions across the country.

The intent of the Standards is to assist the long-term preservation of a property's significance through the preservation of historic materials and features. The Standards pertain to historic buildings of all materials, construction types, sizes, and occupancy and encompass the exterior and interior of the buildings. They also encompass related landscape features and the building's site and environment, as well as attached, adjacent, or re-

lated new construction. To be certified for Federal tax purposes, a rehabilitation project must be determined by the Secretary to be consistent with the historic character of the structure(s), and where applicable, the district in which it is located.

## THE STANDARDS FOR REHABILITATION ARE AS FOLLOWS:

The following Standards are to be applied to specific rehabilitation projects in a reasonable manner, taking into consideration economic and technical feasibility.

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.
2. The historic character of a property shall be retained and preserved. The removal of historic materials or alterations of features and spaces that characterize a property shall be avoided.
3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding cultural features or architectural elements from other buildings, shall not be undertaken.
4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.
6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.
7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old

and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

As stated in the definition, the treatment “rehabilitation” assumes that at least some repair or alteration of the historic building will need to take place in order to provide for an efficient contemporary use; however these repairs and alterations must not damage or destroy the materials and features - including their finishes - that are important in defining the building’s historic character. For example, certain treatments - if improperly applied - may cause or accelerate physical deterioration of historic building. This can include using improper repointing or exterior masonry cleaning techniques, or introducing insulation that damages historic fabric. In almost all of these situations, use of these materials and treatments will result in a project that does not meet the Standards. Similarly, exterior additions that duplicate the form, material, and detailing of the structure to the extent that they compromise the historic character of the structure will fail to meet the Standards.

## TECHNICAL GUIDANCE PUBLICATIONS

The National Park Service, U.S. Department of the Interior, conducts a variety of activities to guide Federal agencies, States, and the general public in historic preservation project work. In addition to establishing standards and guidelines, the Service develops, publishes, and distributes technical information on appropriate preservation treatments, including Preservation Briefs, case studies, and Preservation Tech Notes.

A Catalog of Historic Preservation Publications with stock numbers, prices, and ordering information may be obtained by writing: Preservation Assistance Division, Technical Preservation Services, P.O. Box 37127, Washington, D.C. 20013-7127.

## GUIDELINES FOR REHABILITATION OF HISTORIC BUILDINGS

The Guidelines were initially developed in 1977 to help property owners, developers, and Federal managers apply the Secretary of the Interior’s “Standards for Rehabilitation” during the project planning stage by providing general design and technical recommendations. Unlike the Standards, the Guidelines are not codified as program requirements. Together with the “Standards for Rehabilitation” they provide a model process for owners, developers, and federal agency managers to follow.

It should be noted at the outset that the Guidelines are intended to assist in applying the Standards to projects generally; consequently, they are not meant to give case-specific advice or address exceptions or rare instances. For example, they cannot tell an owner or developer which features of their own historic building are important in defining the historic character and must be preserved - although examples are provided in each section - or which features could be altered, if necessary, for the new use. This kind of careful case-by-case decision-making is best accomplished by seeking assistance from qualified historic preservation professionals in the planning stage of the project. Such professionals include architects, architectural historians, historians, archaeologists, and others who are skilled in the preservation, rehabilitation, and restoration of historic properties.

The Guidelines pertain to historic buildings of all sizes, materials, occupancy, and construction types; and apply to interior and exterior work as well as new exterior additions. Those approaches, treatments, and techniques that are consistent with the Secretary of the Interior’s “Standards for Rehabilitation” are listed under “Recommended” those approaches, treatments, and techniques which could adversely affect a building’s historic character are listed under “Not Recommended” below.

To provide clear and consistent guidance for owners, developers, and federal agency managers to follow, the “Recommended” courses of action in each section are listed in order of historic preservation concerns so that a rehabilitation project may be successfully planned and completed - one that, first, assures the preservation of a building’s important or “character-defining” architectural materials and features and second, makes possible an efficient contemporary use. Rehabilitation guidance in each section begins with protection and maintenance, that work which should be maximized in every project to enhance over-

all preservation goals. Next, where some deterioration is present, repair of the building's historic materials and features is recommended. Finally, when deterioration is so extensive that repair is not possible, the most problematic area of work is considered: replacement of historic materials and features with new materials.

To further guide the owner and developer in planning a successful rehabilitation project, those complex design issues dealing with new use requirements such as alterations and additions are boxed at the end of each section to underscore the need for particular sensitivity in these areas.

## IDENTIFY, RETAIN, AND PRESERVE

The guidance that is basic to the treatment of all historic buildings - identifying, retaining, and preserving the form and detailing those architectural materials and features that are important in defining the historic character - is always listed first under "Recommended." The "Not Recommended" column lists the types of actions that are most apt to cause the diminution or even loss of the building's historic character. It should be remembered, however, that such loss of character is just as often caused by the cumulative effect of a series of actions that would seem to be minor interventions. Thus, the guidance in all of the "Not Recommended" items must be viewed in that larger context, e.g. for the total impact on a historic building.

## PROTECT AND MAINTAIN

After identifying those materials and features that are important and must be retained in the process of rehabilitation work, then protecting and maintaining them are addressed. Protection generally involves the least degree of intervention and is preparatory to other work. For example, protection includes the maintenance of historic material through treatments such as rust removal, caulking, limited paint removal, and re-application of protective coatings; the cyclical cleaning of roof gutter systems; or installation of fencing, protective plywood, alarm systems and other temporary protective measures. Although an historic building will usually require more extensive work, an overall evaluation of its physical condition should always begin at this level.

## REPAIR

Next, when the physical condition of character-defining materials and features warrants additional work repairing is recommended. Guidance for the repair of historic materials such as masonry, wood, and architectural metals again begins with the least degree of intervention possible such as patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading them according to recognized preservation methods. Repairing also includes the limited replacement in kind - or with compatible substitute material - of extensively deteriorated or missing parts of features when there are surviving prototypes (for example, brackets, dentils, steps, plaster, or portions of slate or tile roofing). Although using the same kind of material is always the preferred option, substitute material is acceptable if the form and design as well as the substitute material itself convey the visual appearance of the remaining parts of the feature and finish.

## REPLACE

Following repair in the hierarchy, guidance is provided for replacing an entire character-defining feature with new material because the level of deterioration or damage of materials precludes repair (for example, and exterior cornice; and interior staircase; or a complete porch or storefront). If the essential form and detailing are still evident so that the physical evidence can be used to re-establish the feature as an integral part of the rehabilitation project, then its replacement is appropriate. Like the guidance for repair, the preferred option is always replacement of the entire feature in kind, that is, with the same material. Because this approach may not always be technically or economically feasible, provisions are made to consider the use of a compatible substitute material.

It should be noted that, while the National Park Service guidelines recommend the replacement of an entire character-defining feature under certain well-defined circumstances, they never recommend removal and replacement with new material of a feature that - although damaged or deteriorated - could reasonably be repaired and thus preserved.



## DESIGN FOR MISSING HISTORIC FEATURES

When an entire interior or exterior feature is missing (for example, an entrance, or cast iron facade; or a principal staircase), it no longer plays a role in physically defining the historic character of the building unless it can be accurately recovered in form and detailing through the process of carefully documenting the historical appearance. Where an important architectural feature is missing, its recovery is always recommended in the guidelines as the first or preferred, course of action. Thus, if adequate historical, pictorial, and physical documentation exists so that the feature may be accurately reproduced, and if it is desirable to re-establish the feature as part of the building's historical appearance, then designing and constructing a new feature based on such information is appropriate. However, a second acceptable option for the replacement feature is a new design that is compatible with the remaining character-defining features of the historic building. The new design should always take into account the size, scale, and material of the historic building itself and, most importantly, should be clearly differentiated so that a false historical appearance is not created.

## ALTERATIONS / ADDITIONS TO HISTORIC BUILDINGS

Some exterior and interior alterations to the historic building are generally needed to assure its continued use, but it is most important that such alterations do not radically change, obscure, or destroy character-defining spaces, materials, features, or finishes. Alterations may include providing additional parking space on an existing historic building site; cutting new entrances or windows on secondary elevations; inserting an additional floor; installing an entirely new mechanical system; or creating an atrium or light well. Alterations may also include the selective removal of buildings or other features of the environment or building site that are intrusive and therefore detract from the overall historic character.

The construction of an exterior addition to a historic building may seem to be essential for the new use, but it is emphasized in the guidelines that such new additions should be avoided, if possible, and considered only after it is determined that those needs cannot be met by altering secondary, i.e. non character-defining interior spaces. If, after a thorough evaluation of interior solutions, and exterior addition is still judged to be the only viable alternative, it should be designed and constructed to be clearly differentiated from the historic building

and so that the character-defining features are not radically changed, obscured, damaged, or destroyed. Additions to historic buildings are referenced within specific sections of the guidelines such as Site, Roof, Structural Systems, etc., but are also considered in more detail in a separate section, NEW ADDITIONS TO HISTORIC BUILDINGS.

## HEALTH AND SAFETY CODE REQUIREMENTS; ENERGY RETROFITTING

These sections of the rehabilitation guidance address work done to meet health and safety code requirements (for example, providing barrier-free access to historic buildings); or retrofitting measures to conserve energy (for example, installing solar collectors in an unobtrusive location of the site). Although this work is quite often an important aspect of rehabilitation projects, it is usually not part of the overall process of protecting or repairing character-defining features; rather, such work is assessed for its potential negative impact on the building's historic character. For this reason, particular care must be taken not to radically change, obscure, damage, or destroy character-defining materials or features in the process of rehabilitation work to meet code and energy requirements.

*Specific information on rehabilitation and preservation technology may be obtained by writing to the National Park Service, at the addresses listed below:*

Preservation Assistance Division  
National Park Service  
P.O. Box 37127  
Washington, D. C.  
20013 - 7127

National Historic Preservation Programs  
Western Regional Office  
National Park Service  
450 Golden Gate Avenue  
P.O. Box 36063  
San Francisco, CA 94102

Division of Cultural Resources  
Rocky Mountain Regional Office  
National Park Service  
655 Parfet Street  
P.O. Box 25287  
Denver, CO 80225

Preservation Services Division  
Southeast Regional Office  
National Park Service  
75 Spring Street S.W., Room 1140  
Atlanta, GA 30303

Office of Cultural Programs  
Mid-Atlantic Regional Office  
National Park Service  
Second and Chestnut Streets  
Philadelphia, PA 19106

Cultural Resource Division  
Alaska Regional Office  
National Park Service  
2525 Gambell Street  
Anchorage, AK 99503



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## BUILDING EXTERIOR

### **MASONRY: Brick, stone terra cotta, concrete, adobe, stucco and mortar**

Masonry features (such as brick cornices and door pediments, stone window architraves, terra cotta brackets and railings) as well as masonry surfaces (modelling, tooling, bonding, patterns, joint size and colour) may be important in defining the historic character of the building. It should be noted that while masonry is among the most durable of historic building materials, it is also the most susceptible to damage by improper maintenance or repair techniques and by harsh or abrasive cleaning methods. Most preservation guidance on masonry thus focuses on such concerns as cleaning and the process of reappointing. For specific guidance on this subject, consult Preservation Briefs: 1,2,3,5,6 and 7.

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#### ***Recommended***

Identifying, retaining and preserving masonry features that are important in defining the overall historic character of the building such as walls, brackets, railings, cornices, window architraves, door pediments, steps and columns; and joint and unit size, tooling and bonding patterns, coatings and colour.

#### ***Not Recommended***

Removing or radically changing masonry features which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Replacing or rebuilding a major portion of exterior masonry walls that could be repaired so that, as a result, the building is no longer historic and is essentially new construction.

Applying paint or other coatings such as stucco to masonry that has been historically unpainted or uncoated to create a new appearance.

Removing paint from historically painted masonry.

Radically changing the type of paint or coating or its colour.

#### ***Recommended***

Protecting and maintaining masonry by providing proper drainage so that water does not stand on flat, horizontal surfaces or accumulate in curved decorative features.

#### ***Not Recommended***

Failing to evaluate and treat the various causes of mortar joint deterioration such as leaking roofs or gutters, differential settlement of the building, capillary action or extreme weather exposure.

#### ***Recommended***

Cleaning masonry only when necessary to halt deterioration or remove heavy soiling.

#### ***Not Recommended***

Cleaning masonry surfaces when they are not heavily soiled to create a new appearance, thus needlessly introducing chemicals or moisture into historic materials.

#### ***Recommended***

Carrying out masonry surface cleaning tests after it has been determined that such cleaning is necessary. Tests should be observed over a sufficient period of time so that both the immediate effects and the long range effects are known to enable selection of the gentlest method possible.

#### ***Not Recommended***

Cleaning masonry surfaces without testing or without sufficient time for the testing results to be of value.

#### ***Recommended***

Cleaning masonry surfaces with the gentlest method possible, such as low pressure water and detergents, using natural bristle brushes.

#### ***Not Recommended***

Sandblasting brick or stone surfaces using dry or wet grit or other abrasives. These methods of cleaning permanently erode the surface of the material and accelerate deterioration.

Using a cleaning method that involves water or liquid chemical solutions when there is any possibility of freezing temperatures.

Cleaning with chemical products that will damage masonry, such as using acid on limestone or marble or leaving chemicals on masonry surfaces.

Applying high pressure water cleaning methods that will damage historic masonry and the mortar joints.

***Recommended***

Inspecting painted masonry surfaces to determine whether repainting is necessary.

***Not Recommended***

Removing paint that is firmly adhering to and thus protecting, masonry surfaces.

***Recommended***

Removing damaged or deteriorated paint only to the next sound layer using the gentlest method possible (e.g., handscraping) prior to repainting.

***Not Recommended***

Using methods of removing paint which are destructive to masonry, such as sandblasting, application of caustic solutions or high pressure waterblasting.

***Recommended***

Applying compatible paint coating system following proper surface preparation.

***Not Recommended***

Failing to follow manufacturers' product and application instructions when repainting masonry.

***Recommended***

Repainting with colours that are historically appropriate to the building and district.

***Not Recommended***

Using new paint colours that are inappropriate to the historic building and district.

***Recommended***

Evaluating the overall condition of the masonry to determine whether more than protection and maintenance are required, that is, if repairs to the masonry features will be necessary.

***Not Recommended***

Failing to undertake adequate measures to assure the preservation of masonry features.

***Recommended***

Repairing masonry walls and other masonry features by repointing the mortar joints where there is evidence of deterioration such as disintegrating mortar, cracks in mortar joints, loose bricks, damp walls or damaged plasterwork.

***Not Recommended***

Removing non-deteriorated mortar from sound joints, then repointing the entire building to achieve a uniform appearance.

***Recommended***

Removing deteriorated mortar by carefully hand-raking the joints to avoid damaging the masonry.

***Not Recommended***

Using electric saws and hammers rather than hand tools to remove deteriorated mortar from joints prior to repointing.

***Recommended***

Duplicating old mortar in strength, composition, colour and texture.

***Not Recommended***

Repointing with mortar of high portland cement content (unless it is the content of the historic mortar). This can often

create a bond that is stronger than the historic material and can cause damage as a result of the differing coefficient of expansion and the differing porosity of the material and the mortar.

Repointing with a synthetic caulking compound.

Using a “scrub” coating technique to repoint instead of traditional repointing methods.

#### ***Recommended***

Duplicating old mortar joints in width and in joint profile.

#### ***Not Recommended***

Changing the width or joint profile when repointing.

#### ***Recommended***

Repairing stucco by removing the damaged material and patching with new stucco that duplicates the old in strength, composition, colour and texture.

#### ***Not Recommended***

Removing sound stucco; or repairing with new stucco that is stronger than the historic material or does not convey the same visual appearance.

#### ***Recommended***

Using mud plaster as a surface coating over unfired, unstabilized adobe because the mud plaster will bond to the adobe.

#### ***Not Recommended***

Applying cement stucco to unfired, unstabilized adobe. Because the cement stucco will not bond properly, moisture can become entrapped between materials, resulting in accelerated deterioration of the adobe.

#### ***Recommended***

Repairing masonry features by patching, piecing-in or consolidating the masonry using recognized preservation methods. Repair may also include the limited replacement in kind - or with compatible substitute material - of those extensively deteriorated or missing parts of masonry features when there are

surviving prototypes such as terra coat brackets or stone balusters.

#### ***Not Recommended***

Replacing an entire masonry feature such as a cornice or balustrade when repair of the masonry and limited replacement of deteriorated or missing parts are appropriate.

Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the masonry feature or that is physically or chemically incompatible.

#### ***Recommended***

Applying new or non-historic surface treatments such as water-repellent coatings to masonry only after repointing and only if masonry repairs have failed to arrest water penetrations problems.

#### ***Not Recommended***

Applying waterproof, water-repellent or non-historic coatings such as stucco to masonry as a substitute for repointing and masonry repairs. Coatings are frequently unnecessary, expensive and may change the appearance of historic masonry as well as accelerate its deterioration.

#### ***Recommended***

Replacing in kind an entire masonry feature that is too deteriorated to repair - if the overall form and detailing are still evident - using the physical evidence to guide the new work. Examples can include large sections of a wall, a cornice, balustrade, column or stairway. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

#### ***Not Recommended***

Removing a masonry feature that is unrepairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

The following work is boxed to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

#### DESIGN FOR MISSING HISTORIC FEATURES

##### **Recommended**

*Designing and installing a new masonry feature such as steps or a door pediment when the historic feature is completely missing. It may be an accurate restoration using historical, pictorial and physical documentation; or be a new design that is compatible with the size, scale, material and colour of the historic building.*

##### **Not Recommended**

Creating a false historical appearance because the replaced masonry feature is based on insufficient historical, pictorial and physical documentation.

Introducing a new masonry feature that is incompatible in size, scale, material and colour.

#### **WOOD: Clapboard, weatherboard, shingles and other wooden siding and decorative elements**

Because it can be easily shaped by sawing, planing, carving and gouging, wood is the most commonly used material for architectural features such as clapboards, cornices, brackets, entablatures, shutters, columns and balustrades. These wooden features - both functional and decorative - may be important in defining the historic character of the building and thus their retention, protection and repair are of particular importance in rehabilitation projects. For specific guidance, consult Preservation Briefs: 9.10 and "Epoxies for Wood Repair in Historic Buildings."

##### **Recommended**

Identifying, retaining and preserving wood features that are important in defining the overall historic character of the building such as siding, cornices, brackets, window architraves

and doorway pediments; and their paints, finishes and colours.

##### **Not Recommended**

Removing or radically changing wood features which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Removing a major portion of the historic wood from a facade instead of repairing or replacing only the deteriorated wood, then reconstructing the facade with new material in order to achieve a uniform or "improved" appearance.

Radically changing the type of finish or its colour or accent scheme so that the historic character of the exterior is diminished.

Stripping historically painted surfaces to bare wood, then applying clear finishes or stains in order to create a "natural look"

Stripping paint or varnish to bare wood rather than repairing or re-applying a special finish, i.e., a grained finish to an exterior wood feature such as a front door.

##### **Recommended**

Protecting and maintaining wood features by providing proper drainage so that water is not allowed to stand on flat, horizontal surfaces or accumulate in decorative features.

##### **Not Recommended**

Failing to identify, evaluate and treat the causes of wood deterioration, including faulty flashing, leaking gutters, cracks and holes in siding, deteriorated caulking in joints and seams, plant material growing too close to wood surfaces, or insect or fungus infestation.

##### **Recommended**

Applying chemical preservatives to wood features such as beam ends or outriggers that are exposed to decay hazards and are traditionally unpainted.

##### **Not Recommended**

Using chemical preservatives such as creosote which can change the appearance of wood features unless they were used historically.

***Recommended***

Retaining coatings such as paint that help protect the wood from moisture and ultraviolet light. Paint removal should be considered only where there is paint surface deterioration and as part of an overall maintenance program which involves repainting or applying other appropriate protective coatings.

***Not Recommended***

Stripping paint or other coatings to reveal bare wood, thus exposing historically coated surfaces to the effects of accelerated weathering.

***Recommended***

Inspecting painted wood surfaces to determine whether repainting is necessary or if cleaning is all that is required.

***Not Recommended***

Removing paint that is firmly adhering to and thus, protecting wood surfaces.

***Recommended***

Removing damaged or deteriorated paint to the next sound layer using the gentlest method possible (handscraping and handsanding), then repainting.

***Not Recommended***

Using destructive paint removal methods such as propane or butane torches, sandblasting or waterblasting. These methods can irreversibly damage historic woodwork.

***Recommended***

Using with care electric hot-air guns on decorative wood features and electric heat plates on flat wood surfaces when paint is so deteriorated that total removal is necessary prior to repainting.

***Not Recommended***

Using thermal devices improperly so that the historic wood work is scorched.

***Recommended***

Using chemical strippers primarily to supplement other methods such as handscraping, handsanding and the above-recommended thermal devices. Detachable wooden elements such as shutters, doors and columns may - with the proper safeguards - be chemically dip- stripped.

***Not Recommended***

Failing to neutralize the wood thoroughly after using chemicals so that new paint does not adhere.

Allowing detachable wood features to soak too long in a caustic solution so that the wood grain is raised and the surface roughened.

***Recommended***

Applying compatible paint coating systems following proper surface preparation.

***Not Recommended***

Failing to follow manufacturers' product and application instructions when repainting exterior woodwork.

***Recommended***

Repainting with colours that are appropriate to the historic building and district.

***Not Recommended***

Using new colours that are inappropriate to the historic building or district.

***Recommended***

Evaluating the overall condition of the wood to determine whether more than protection and maintenance are required, that is, if repairs to wood features will be necessary.

***Not Recommended***

Failing to undertake adequate measures to assure the preservation of wood features.



**Recommended**

Repairing wood features by patching, piecing-in consolidating or otherwise reinforcing the wood using recognized preservation methods. Repair may also include the limited replacement in kind - or with compatible substitute material - of those extensively deteriorated or missing parts of features where there are surviving prototypes such as brackets, moldings or sections of siding.

**Not Recommended**

Replacing an entire wood feature such as a cornice or wall when repair of the wood and limited replacement of deteriorated or missing parts are appropriate.

Using substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the wood feature or that is physically or chemically incompatible.

**Recommended**

Replacing in kind an entire wood feature, that is too deteriorated to repair - if the overall form and detailing are still evident - using the physical evidence to guide the new work. Examples of wood features include a cornice, entablature or balustrade. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

**Not Recommended**

Removing an entire wood feature that is unrepairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

The following work is boxed because it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

**DESIGN FOR MISSING HISTORIC FEATURES****Recommended**

*Designing and installing a new wood feature such as a cornice or doorway when the historic feature is completely missing. It may be an accurate restoration using historical, pictorial and physical documentation; or be a new design that is compatible with the size, scale, material and colour of the historic building.*

**Not Recommended**

Creating a false historic appearance because the replaced wood feature is based on insufficient historical, pictorial and physical documentation.

Introducing a new wood feature that is incompatible in size, scale, material and colour.

**ARCHITECTURAL METALS: Cast-iron, steel, pressed tin, copper, aluminium and zinc**

Architectural metal features - such as cast-iron facades, porches and steps; sheet metal cornices, roofs, roof cresting and storefronts; and cast or rolled metal doors, window sash, entablatures and hardware - are often highly decorative and may be important in defining the overall historic character of the building. Their retention, protection and repair should be a prime consideration in rehabilitation projects. For specific guidance, consult "Metals in America's Historic Buildings."

**Recommended**

Identifying, retaining and preserving architectural metal features such as columns, capitals, window hoods or stairways that are important in defining the overall historic character of the building; and their finishes and colours.

**Not Recommended**

Removing or radically changing architectural metal features which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Removing a major portion of the historic architectural metal from a facade instead of repairing or replacing only the deteriorated metal, then reconstructing the facade with new material in order to create a uniform, or "improved" appearance.

Radically changing the type of finish or its historic colour or accent scheme.

#### ***Recommended***

Protecting and maintaining architectural metals from corrosion by providing proper drainage so that water does not stand on flat, horizontal surfaces or accumulate in curved, decorative features.

#### ***Not Recommended***

Failing to identify, evaluate and treat the causes of corrosion, such as moisture from leaking roofs or gutters.

Placing incompatible metals together without providing a reliable separation material. Such incompatibility can result in galvanic corrosion of the less noble metal, e.g., copper will corrode cast-iron, steel, tin and aluminium.

#### ***Recommended***

Cleaning architectural metals, when necessary, to remove corrosion prior to repainting or applying other appropriate protective coatings.

#### ***Not Recommended***

Exposing metals which were intended to be protected from the environment.

Applying paint or other coatings to metals such as copper, bronze, or stainless steel that were meant to be exposed.

#### ***Recommended***

Identifying the particular type of metal prior to any cleaning procedure and then testing to assure that the gentlest cleaning method possible is selected or determining that cleaning is inappropriate for the particular metal.

#### ***Not Recommended***

Using cleaning methods which alter or damage the historic colour, texture and finish of the metal; or cleaning when it is inappropriate for the metal.

Removing the patina of historic metal. The patina may be a protective coating on some metals, such as bronze or copper, as well as a significant historic finish.

#### ***Recommended***

Cleaning soft metals such as lead, tin, copper,terneplate and zinc with appropriate chemical methods because their finishes can be easily abraded by blasting methods.

#### ***Not Recommended***

Cleaning soft metals such as lead, tin, copper,terneplate and zinc with grit blasting which will abrade the surface of the metal.

#### ***Recommended***

Using the gentlest cleaning methods for cast-iron, wrought iron and steel - hard metals - in order to remove paint buildup and corrosion. If handscraping and wire brushing have proven ineffective, low pressure dry grit blasting may be used as long as it does not abrade or damage the surface.

#### ***Not Recommended***

Failing to employ gentler methods prior to abrasively cleaning cast-iron, wrought iron or steel; or using high pressure grit blasting.

#### ***Recommended***

Applying appropriate paint or other coating systems after cleaning in order to decrease the corrosion rate of metals or alloys.

#### ***Not Recommended***

Failing to re-apply protective coating systems to metals or alloys that require them after cleaning so that accelerated corrosion occurs.

#### ***Recommended***

Repainting with colours that are appropriate to the historic building or district.

*Not Recommended*

Using new colours that are inappropriate to the historic building or district.

*Recommended*

Applying an appropriate protective coating such as lacquer to an architectural metal feature such as a bronze door which is subject to heavy pedestrian use.

*Not Recommended*

Failing to assess pedestrian use or new access patterns so that architectural metal features are subject to damage by use or inappropriate maintenance such as salting adjacent sidewalks.

*Recommended*

Evaluating the overall condition of the architectural metals to determine whether more than protection and maintenance are required, that is, if repairs to features will be necessary.

*Not Recommended*

Failing to undertake adequate measures to assure the preservation of architectural metal features.

*Recommended*

Repairing architectural metal features by patching, splicing or otherwise reinforcing the metal following recognized preservation methods. Repairs may also include the limited replacement in kind - or with a compatible substitute material - of those extensively deteriorated or missing parts of features when there are surviving prototypes such as porch balusters, column capitals or bases; or porch cresting.

*Not Recommended*

Replacing an entire architectural metal feature such as a column or a balustrade when repair of the metal and limited replacement of deteriorated or missing parts are appropriate.

Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the architectural metal feature or that is physically or chemically incompatible.

*Recommended*

Replacing in kind an entire architectural metal feature that is too deteriorated to repair - if the overall form and detailing are still evident - using the physical evidence to guide the new work. Examples could include cast-iron porch steps or steel sash windows. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

*Not Recommended*

Removing an architectural metal feature that is unrepairable and not replacing it; or replacing it with a new architectural metal feature that does not convey the same visual appearance.

The following work is boxed to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

*DESIGN FOR MISSING HISTORIC FEATURES**Recommended*

*Design and installing a new architectural metal feature such as a sheet metal cornice or cast-iron capital when the historic feature is completely missing. It may be an accurate restoration using historical, pictorial and physical documentation; or be a new design that is compatible with the size, scale, material and colour of the historic building.*

*Not Recommended*

Creating a false historic appearance because the replaced architectural metal feature is based on insufficient historical, pictorial and physical documentation.

Introducing a new architectural metal feature that is incompatible in size, scale, material and colour.

## ROOFS

The roof - with its shape; features such as cresting, dormers, cupolas and chimneys; and the size, colour and patterning of the roofing material - can be extremely important in defining the building's overall historic character. In addition to the design role it plays, a weathertight roof is essential to the preservation of the entire structure; thus, protecting and repairing the roof as a "cover" is a critical aspect of every rehabilitation project. For specific guidance on roofs and roofing material, consult Preservation Briefs: 4.

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### *Recommended*

Identifying, retaining and preserving roofs - and their functional and decorative features - that are important in defining the overall historic character of the building. This includes the roof's shape, such as hipped, gambrel and mansard; decorative features such as cupolas, cresting, chimneys and weathervanes; and roofing material such as slate, wood, clay tile and metal, as well as its size, colour and patterning.

### *Not Recommended*

Radically changing, damaging or destroying roofs which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Removing a major portion of the roof or roofing material that is repairable then reconstructing it with new material in order to create a uniform or "improved" appearance.

Changing the configuration of a roof by adding new features such as dormer windows, vents or skylights so that the historic character is diminished. Stripping the roof of sound historic material such as slate, clay tile, wood and architectural metal.

Applying paint or other coatings to roofing material which has been historically uncoated.

### *Recommended*

Protecting and maintaining a roof by cleaning the gutters and downspouts and replacing deteriorated flashing. Roof sheathing should also be checked for proper venting to prevent moisture condensation and water penetration; and to insure that materials are free from insect infestation.

### *Not Recommended*

Failing to clean and maintain gutters and downspouts properly so that water and debris collect and cause damage to roof fasteners, sheathing and the underlying structure.

### *Recommended*

Providing adequate anchorage for roofing material to guard against wind damage and moisture penetration.

### *Not Recommended*

Allowing roof fasteners, such as nails and clips to corrode so that roofing material is subject to accelerated deterioration.

### *Recommended*

Protecting a leaking roof with plywood and building paper until it can be properly repaired.

### *Not Recommended*

Permitting a leaking roof to remain unprotected so that accelerated deterioration of historic building materials - masonry, wood, plaster, paint and structural members - occurs.

### *Recommended*

Repairing a roof by reinforcing the historic materials which comprise roof features. Repairs will also generally include the limited replacement in kind - or with compatible substitute material - of those extensively deteriorated or missing parts of features when there are surviving prototypes such as cupola louvers, dentils, dormer roofing; or slates, tiles or wood shingles on a main roof.

### *Not Recommended*

Replacing an entire roof feature such as a cupola or dormer when repair of the historic materials and limited replacement of deteriorated or missing parts are appropriate.

Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the roof or that is physically or chemically incompatible.

**Recommended**

Replacing in kind an entire feature of the roof that is too deteriorated to repair - if the overall form and detailing are still evident - using the physical evidence to guide the new work. Examples can include a large section of roofing or a dormer or chimney. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

**Not Recommended**

Removing a feature of the roof that is unrepairable, such as a chimney or dormer and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

The following work is boxed to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed

**DESIGN FOR MISSING HISTORIC FEATURES****Recommended**

*Designing and constructing a new feature when the historic feature is completely missing, such as a chimney or cupola. It may be an accurate restoration using historical, pictorial and physical documentation; or be a new design that is compatible with the size, scale, material and colour of the historic building.*

**Not Recommended**

Creating a false historic appearance because the replaced architectural metal feature is based on insufficient historical, pictorial and physical documentation.

Introducing a new architectural metal feature that is incompatible in size, scale, material and colour.

**ALTERATIONS/ADDITIONS FOR THE NEW USE****Recommended**

*Installing mechanical and service equipment on the roof such as air conditioning, transformers or solar collectors when required for the new use so that they are inconspicuous from the public right-of-way and do not damage or obscure character-defining features.*

*Designing additions to roofs such as residential, office or storage spaces; elevator housing; decks and terraces; or dormers or skylights when required by the new use so that they are inconspicuous from the public right-of-way and do not damage or obscure character-defining features.*

**Not Recommended**

Installing mechanical or service equipment so that it damages or obscures character-defining features; or is conspicuous from the public right-of-way.

Radically changing a character-defining roof shape or damaging or destroying character-defining roofing material as a result of incompatible design or improper installation techniques.

**WINDOWS**

A highly decorative window with an unusual shape or glazing pattern or colour is most likely identified immediately as a character-defining feature of the building. It is far more difficult, however, to assess the importance of repeated windows on a facade, particularly if they are individually simple in design and material, such as the large, multi-paned sash of many industrial buildings. Because rehabilitation projects frequently include proposals to replace window sash or even entire windows to improve thermal efficiency or to create a new appearance, it is essential that their contribution to the overall historic character of the building be assessed together with their physical condition before specific repair or replacement work is undertaken. See also Energy Retrofitting. Preservation Briefs: 9 should be consulted for specific guidance on wooden window repair.



**Recommended**

Identifying, retaining and preserving windows - and their functional and decorative features - that are important in defining the overall historic character of the building. Such features can include frames, sash, muntins, glazing, sills, heads, hoodmolds, paneled or decorated jambs and moldings and interior and exterior shutters and blinds.

**Not Recommended**

Removing or radically changing windows which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Changing the number, location, size or glazing pattern of windows through cutting new openings, blocking-in windows and installing a replacement sash which does not fit the historic window opening.

Changing the historic appearance of windows through the use of inappropriate designs, materials, finishes or colours which radically change the sash, depth of reveal and muntin configuration; the reflectivity and colour of the glazing; or the appearance of the frame.

Obscuring historic window trim with metal or other material.

Stripping windows of historic material such as wood, iron, cast-iron and bronze.

**Recommended**

Protecting and maintaining the wood and architectural metal which comprise the window frame, sash, muntins and surrounds through appropriate surface treatments such as cleaning, rust removal, limited paint removal and re-application of protective coating systems.

**Not Recommended**

Failing to provide adequate protection of materials on a cyclical basis so that deterioration of the windows results.

**Recommended**

Making windows weathertight by recaulking and replacing or installing weatherstripping. These actions also improve thermal efficiency.

**Not Recommended**

Retrofitting or replacing windows rather than maintaining the sash, frame and glazing.

**Recommended**

Evaluating the overall condition of materials to determine whether more than protection and maintenance are required, i.e. if repairs to windows and window features will be required.

**Not Recommended**

Failing to undertake adequate measures to assure the preservation of historic windows.

**Recommended**

Repairing window frames and sash by patching, splicing, consolidating or otherwise reinforcing. Such repair may also include replacement in kind of those parts that are either extensively deteriorated or are missing when there are surviving prototypes such as architraves, hoodmolds, sash, sills and interior or exterior shutters and blinds.

**Not Recommended**

Replacing an entire window when repair of materials and limited replacement of deteriorated or missing parts are appropriate.

Failing to reuse serviceable window hardware such as brass lifts and sash locks.

Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the window or that is physically or chemically incompatible.

**Recommended**

Replacing in kind an entire window that is too deteriorated to repair - if the overall form and detailing are still evident - using the physical evidence to guide the new work. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

*Not Recommended*

Removing a character-defining window that is unrepairable and blocking it in; or replacing it with a new window that does not convey the same visual appearance.

The following work is boxed to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

*DESIGN FOR MISSING FEATURES**Recommended*

*Designing and installing new windows when the historic windows (frame, sash and glazing) are completely missing. The replacement windows may be an accurate restoration using historical, pictorial and physical documentation; or be a new design that is compatible with the window openings and the historic character of the building*

*Not Recommended*

Creating a false historical appearance because the replaced window is based on insufficient historical, pictorial and physical documentation.

Introducing a new design that is incompatible with the historic character of the building.

*ALTERATIONS/ADDITIONS FOR THE NEW USE**Recommended*

*Designing and installing additional windows on rear or other-non character-defining elevations if required by the new use. New window openings may also be cut into exposed party walls. Such design should be compatible with the overall design of the building, but not duplicate the fenestration pattern and detailing of a character-defining elevation.*

*Providing a setback in the design of dropped ceilings when they are required for the new use to allow for the full height of the window openings.*

*Not Recommended*

Installing new windows, including frames, sash and muntin configuration that are incompatible with the building's historic appearance or obscure, damage or destroy character-defining features.

Inserting new floors or furred-down ceilings which cut across the glazed areas of windows so that the exterior form and appearance of the windows are changed.

**ENTRANCES AND PORCHES**

Entrances and porches are quite often the focus of historic buildings, particularly when they occur on primary elevations. Together with their functional and decorative features such as doors, steps, balustrades, pilasters and entablatures, they can be extremely important in defining the overall historic character of a building. Their retention, protection and repair should always be carefully considered when planning rehabilitation work.

*Recommended*

Identifying, retaining and preserving entrances - and their functional and decorative features - that are important in defining the overall historic character of the building such as doors, fanlights, sidelights, pilasters, entablatures, columns, balustrades and stairs.

*Not Recommended*

Removing or radically changing entrances and porches which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Stripping entrances and porches of historic material such as wood, iron, cast-iron, terra cotta, tile and brick.

Removing an entrance or porch because the building has been re-oriented to accommodate a new use.

Cutting new entrances on a primary elevation.

Altering utilitarian or service entrances so they appear to be formal entrances by adding panelled doors, fanlights and side-

lights.

### **Recommended**

Protecting and maintaining the masonry, wood and architectural metal that comprise entrances and porches through appropriate surface treatments such as cleaning, rust removal, limited paint removal and re-application of protective coating systems.

### **Not Recommended**

Failing to provide adequate protection to materials on a cyclical basis so that deterioration of entrances and porches results.

### **Recommended**

Evaluating the overall condition of materials to determine whether more than protection and maintenance are required, that is, if repairs to entrance and porch features will be necessary.

### **Not Recommended**

Failing to undertake adequate measures to assure the preservation of historic entrances and porches.

### **Recommended**

Repairing entrances and porches by reinforcing the historic materials. Repair will also generally include the limited replacement in kind - or with compatible substitute material - of those extensively deteriorated or missing parts of repeated features where there are surviving prototypes such as balustrades, cornices, entablatures, columns, sidelights and stairs.

### **Not Recommended**

Replacing an entire entrance or porch when the repair of materials and limited replacement of parts are appropriate.

Using a substitute material for the replacement parts that does not convey the visual appearance of the surviving parts of the entrance and porch or that is physically or chemically incompatible.

### **Recommended**

Replacing in kind an entire entrance or porch that is too

deteriorated to repair - if the form and detailing are still evident - using the physical evidence to guide the new work. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

### **Not Recommended**

Removing an entrance or porch that is unrepairable and not replacing it; or replacing it with a new entrance or porch that does not convey the same visual appearance.

The following work is boxed to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

#### *DESIGN FOR MISSING HISTORIC FEATURES*

##### **Recommended**

*Designing and constructing a new entrance or porch if the historic entrance or porch is completely missing. It may be a restoration based on historical, pictorial and physical documentation; or be a new design that is compatible with the historic character of the building.*

##### **Not Recommended**

Creating a false historical appearance because the replaced entrance or porch is based on insufficient historical, pictorial and physical documentation.

Introducing a new entrance or porch that is incompatible in size, scale, material and colour.

#### *ALTERATIONS/ADDITIONS FOR THE NEW USE*

##### **Recommended**

*Designing enclosures for historic porches when required by the new use in manner that preserves the historic character of the building. This can include using large sheets of glass and recessing the enclosure wall behind existing scrollwork, posts and balustrades.*

*Designing and installing additional entrances or porches when required for the new use in a manner that preserves the historic character of the building, i.e., limiting such alteration to non-character-defining elevations.*

*Not Recommended*

Enclosing porches in a manner that results in a diminution or loss of historic character such as using solid materials such as wood, stucco or masonry.

Installing secondary service entrances and porches that are incompatible in size and scale with the historic building or obscure, damage or destroy character-defining features.

## STOREFRONTS

Storefronts are quite often the focus of historic commercial buildings and can thus be extremely important in defining the overall historic character. Because storefronts also play a crucial role in a store's advertising and merchandising strategy to draw customers and increase business, they are often altered to meet the needs of a new business. Particular care is required in planning and accomplishing work on storefronts so that the building's historic character is preserved in the process of rehabilitation. For specific guidance on the subject Preservation Briefs: 11 should be consulted.

**Recommended**

Identifying, retaining and preserving storefronts - and their functional and decorative features - that are important in defining the overall historic character of the building such as display windows, signs, doors, transoms, kick plates, corner posts and entablatures.

*Not Recommended*

Removing or radically changing storefronts - and their features - which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Changing the storefront so that it appears residential rather than commercial in character.

Removing historic material from the storefront to create a recessed arcade.

Introducing coach lanterns, mansard overhangings, wood shakes, nonoperable shutters and small-paned windows if they cannot be documented historically.

Changing the location of a storefront's main entrance.

**Recommended**

Protecting and maintaining masonry, wood and architectural metals which comprise storefronts through appropriate treatments such as cleaning, rust removal, limited paint removal and re-application of protective coating systems.

*Not Recommended*

Failing to provide adequate protection to materials on a cyclical basis so that deterioration of storefront features results.

**Recommended**

Protecting storefronts against arson and vandalism before work begins by boarding up windows and installing alarm systems that are keyed into local protection agencies.

*Not Recommended*

Permitting entry into the building through unsecured or broken windows and doors so that interior features and finishes are damaged through exposure to weather or through vandalism.

Stripping storefronts of historic material such as wood, cast-iron, terra cotta, carrara glass and brick.

**Recommended**

Evaluating the overall conditions of storefront materials to determine whether more than protection and maintenance are required, that is, if repairs to features will be necessary.

*Not Recommended*

Failing to undertake adequate measures to assure the preservation of the historic storefront.

**Recommended**

Repairing storefronts by reinforcing the historic materials. Repairs will also generally include the limited replacement



in kind - or with compatible substitute material - of those extensively deteriorated or missing parts of storefronts where there are surviving prototypes such as transoms, kick plates, pilasters or signs.

#### *Not Recommended*

Replacing an entire storefront when repair of materials and limited replacement of its parts are appropriate.

Using substitute material for the replacement parts that does not convey the same visual appearance as the surviving parts of the storefront or that is physically or chemically incompatible.

#### *Recommended*

Replacing in kind an entire storefront that is too deteriorated to repair - if the overall form and detailing are still evident - using the physical evidence to guide the new work. If using the same material is not technically or economically feasible, then compatible substitute materials may be considered.

#### *Not Recommended*

Removing a storefront that is unrepairable and not replacing it; or replacing it with a new storefront that does not convey the same visual appearance.

The following work is boxed to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

#### *DESIGN FOR MISSING HISTORIC FEATURES*

##### *Recommended*

*Designing and constructing a new storefront when the historic storefront is completely missing. It may be an accurate restoration using historical, pictorial and physical documentation; or be a new design that is compatible with the size, scale, material and colour of the historic building. Such new design should generally be flush with the facade; and the treatment of secondary design elements, such as awnings or signs, kept as simple as possible. For example,*

*new signs should fit flush with the existing features of the facade, such as the fascia board or cornice.*

##### *Not Recommended*

Creating a false historical appearance because the replaced storefront is based on insufficient historical, pictorial and physical documentation.

Introducing a new design that is incompatible in size, scale, material and colour.

Using new illuminated signs; inappropriately scaled signs and logos; signs that project over the sidewalk unless they were a characteristic feature of the historic building; or other types of signs that obscure or destroy remaining character - defining features of the historic building.

#### **BUILDING INTERIOR: Structural System**

If features of the structural system are exposed such as load-bearing brick walls, cast-iron columns, roof trusses, posts and beams, vigas or stone foundation walls, they may be important in defining the building's overall historic character. Unexposed structural features that are not character-defining or an entire structural system may nonetheless be significant in the history of building technology; therefore, the structural system should always be examined and evaluated early in the project planning stage to determine both its physical condition and its importance to the building's historic character or historical significance. See also Health and Safety Code Requirements.

##### *Recommended*

Identifying, retaining and preserving structural systems - and individual features of systems - that are important in defining the overall historic character of the building, such as post and beam systems, trusses, summer beams, vigas, cast-iron columns, above-grade stone foundation walls or load-bearing brick or stone walls.

##### *Not Recommended*

Removing, covering or radically changing features of structural systems which are important in defining the overall historic character of the building so that, as a result, the character is diminished.



Putting a new use into the building which could overload the existing structural system; or installing equipment or mechanical systems which could damage the structure.

Demolishing a load-bearing masonry wall that could be augmented and retained and replacing it with a new wall (i.e., brick or stone), using the historic masonry only as an exterior veneer.

Leaving known structural problems untreated such as deflection of beams, cracking and bowing of walls or racking of structural members.

Utilizing treatments or products that accelerate the deterioration of structural material such as introducing ureaformaldehyde foam insulation into frame walls.

#### ***Recommended***

Protecting and maintaining the structural system by cleaning the roof gutters and downspouts; replacing roof flashing; keeping masonry, wood and architectural metals in a sound condition; and assuring that structural members are free from insect infestation.

#### ***Not Recommended***

Failing to provide proper building maintenance on a cyclical basis so that deterioration of the structural system results.

#### ***Recommended***

Examining and evaluating the physical condition of the structural system and its individual features using non-destructive techniques such as X-ray photography.

#### ***Not Recommended***

Utilizing destructive probing techniques that will damage or destroy structural material.

#### ***Recommended***

Repairing the structural system by augmenting or upgrading individual parts or features. For example, weakened structural members such as floor framing can be spliced, braced or otherwise supplemented and reinforced.

#### ***Not Recommended***

Upgrading the building structurally in a manner that di-

minishes the historic character of the exterior, such as installing strapping channels or removing a decorative cornice; or damages interior features or spaces.

Replacing a structural member or other feature of the structural system when it could be augmented and retained.

#### ***Recommended***

Replacing in kind - or with substitute material - those portions or features of the structural system that are either extensively deteriorated or are missing when there are surviving prototypes such as cast-iron columns, roof rafters or trusses or sections of load-bearing walls. Substitute material should convey the same form, design and overall visual appearance as the historic feature; and, at a minimum, be equal to its load-bearing capabilities.

#### ***Not Recommended***

Installing a replacement feature that does not convey the same visual appearance, e.g., replacing an exposed wood summer beam with a steel beam.

Using substitute material that does not equal the load-bearing capabilities of the historic material and design or is otherwise physically or chemically incompatible.

The following work is boxed to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed

#### ***ALTERATIONS/ADDITIONS FOR THE NEW USE***

#### ***Recommended***

*Limiting any new excavations adjacent to historic foundations to avoid undermining the structural stability of the building or adjacent historic buildings.*

#### ***Not Recommended***

Carrying out excavations or regrading adjacent to or within a historic building which could cause the historic foundation to settle, shift or fail; or could have a similar effect on adjacent historic buildings.

**Recommended**

*Correcting structural deficiencies in preparation for the new use in a manner that preserves the structural system and individual character-defining features.*

**Not Recommended**

Radically changing interior spaces or damaging or destroying features or finishes that are character-defining while trying to correct structural deficiencies in preparation for the new use.

**Recommended**

*Designing and installing new mechanical or electrical systems when required for the new use which minimize the number of cutouts or holes in structural members.*

**Not Recommended**

Installing new mechanical and electrical systems or equipment in a manner which results in numerous cuts, splices or alterations to the structural members.

**Recommended**

*Adding a new floor when required for the new use if such an alteration does not damage or destroy the structural system or obscure, damage or destroy character-defining spaces, features or finishes.*

**Not Recommended**

Inserting a new floor when such a radical change damages a structural system or obscures or destroys interior spaces, features or finishes.

Inserting new floors or furred-down ceilings which cut across the glazed areas of windows so that the exterior form and appearance of the windows are radically changed

**Recommended**

*Creating an atrium or a light well to provide natural light when required for the new use in a manner that assures the preservation of the structural system as well as character-defining interior spaces, features and finishes.*

**Not Recommended**

Damaging the structural system or individual features; or radically changing, damaging or destroying character-defining interior spaces, features or finishes in order to create an atrium or a light well.

**INTERIOR: Spaces, features and finishes**

An interior floor plan, the arrangement of spaces and built-in features and applied finishes may be individually or collectively important in defining the historic character of the building. Thus, their identification, retention, protection and repair should be given prime consideration in every rehabilitation project and caution exercised in pursuing any plan that would radically change character-defining spaces or obscure, damage or destroy interior features or finishes.

**INTERIOR SPACES****Recommended**

Identifying, retaining and preserving a floor plan or interior spaces that are important in defining the overall historic character of the building. This includes the size, configuration, proportion and relationship of rooms and corridors; the relationship of features to spaces; and the spaces themselves such as lobbies, reception halls, entrance halls, double parlors, theatres, auditoriums and important industrial or commercial use spaces.

**Not Recommended**

Radically changing a floor plan or interior spaces - including individual rooms - which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Altering the floor plan by demolishing principal walls and partitions to create a new appearance.

Altering or destroying interior spaces by inserting floors, cutting through floors, lowering ceilings or adding or removing walls.

## INTERIOR FEATURES AND FINISHES

### *Recommended*

Identifying, retaining and preserving interior features and finishes that are important in defining the overall historic character of the building, including columns, cornices, baseboards, fireplaces and mantels, paneling, light fixtures, hardware and flooring; and wallpaper, plaster, paint and finishes such as stencilling, marbling and graining; and other decorative materials that accent interior features and provide colour, texture and patterning to walls, floors and ceilings.

### *Not Recommended*

Relocating an interior feature such as a staircase so that the historic relationship between features and spaces is altered.

Removing or radically changing features and finishes which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Installing new decorative material that obscures or damages character-defining interior features or finishes.

Removing paint, plaster or other finishes from historically finished surfaces to create a new appearance (e.g., removing plaster to expose masonry surfaces such as brick walls or a chimney piece).

Applying paint, plaster or other finishes to surfaces that have been historically unfinished to create a new appearance.

Stripping historically painted wood surfaces to bare wood, then applying clear finishes or stains to create a "natural look".

Stripping paint to bare wood rather than repairing or re-applying grained or marbled finishes to features such as doors and paneling.

Radically changing the type of finish or its colour, such as painting a previously varnished wood feature.

### *Recommended*

Protecting and maintaining masonry, wood and architectural metals which comprise interior features through appropriate surface treatments such as cleaning and re-application of protective coatings systems.

### *Not Recommended*

Failing to provide adequate protection to materials on a cyclical basis so that deterioration of interior features results.

### *Recommended*

Protecting interior features and finishes against arson and vandalism before project work begins, erecting protective fencing, boarding-up windows and installing fire alarm systems that are keyed to local protection agencies.

### *Not Recommended*

Permitting entry into historic building through unsecured or broken windows and doors so that interior features and finishes are damaged by exposure to weather or through vandalism.

Stripping interiors of features such as woodwork, doors, windows, light fixtures, copper piping, radiators; or of decorative materials.

### *Recommended*

Protecting interior features such as a staircase, mantel or decorative finishes and wall coverings against damage during project work by covering them with heavy canvas or plastic sheets.

### *Not Recommended*

Failing to provide proper protection of interior features and finishes during work so that they are gouged, scratched, dented or otherwise damaged.

### *Recommended*

Installing protective coverings in areas of heavy pedestrian traffic to protect historic features such as wall coverings, parquet flooring and paneling.

### *Not Recommended*

Failing to take new use patterns into consideration so that interior features and finishes are damaged.

### *Recommended*

Removing damaged or deteriorated paints and finishes to the next sound layer using the gentlest method possible, then repainting or refinishing using compatible paint or other coating systems.

***Not Recommended***

Using destructive methods such as propane or butane torches or sandblasting to remove paint or other coatings. These methods can irreversibly damage the historic materials that comprise interior features.

***Recommended***

Repainting with colours that are appropriate to the historic building.

***Not Recommended***

Using new paint colours that are inappropriate to the historic building.

***Recommended***

Limiting abrasive cleaning methods to certain industrial or warehouse buildings where the interior masonry or plaster features do not have distinguishing design, detailing, tooling or finishes; and where wood features are not finished, molded, beaded or worked by hand. Abrasive cleaning should only be considered after other, gentler methods have been proven ineffective.

***Not Recommended***

Changing the texture and patina of character-defining features through sandblasting or use of other abrasive methods to remove paint, discoloration or plaster. This includes both exposed wood (including structural members) and masonry.

***Recommended***

Evaluating the overall condition of materials to determine whether more than protection and maintenance are required, that is, if repairs to interior features and finishes will be necessary.

***Not Recommended***

Failing to undertake adequate measures to assure the preservation of interior features and finishes.

***Recommended***

Repairing interior features and finishes by reinforcing the historic materials. Repair will also generally include the limited

replacement in kind - or with compatible substitute material - of those extensively deteriorated or missing parts of repeated features when there are surviving prototypes such as stairs, balustrades, wood paneling, columns; or decorative wall coverings or ornamental tin or plaster ceilings.

***Not Recommended***

Replacing an entire interior feature such as a staircase, paneled wall, parquet floor or cornice; or finish such as a decorative wall covering or ceiling when repair of materials and limited replacement of such parts are appropriate.

Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts or portions of the interior feature or finish or that is physically or chemically incompatible.

***Recommended***

Replacing in kind an entire interior feature or finish that is too deteriorated to repair - if the overall form and detailing are still evident - using the physical evidence to guide the new work. Examples could include wainscoting, a tin ceiling or interior stairs. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

***Not Recommended***

Removing a character-defining feature of finish that is unrepairable and not replacing it; or replacing it with a new feature or finish that does not convey the same visual appearance.

The following work is boxed to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed

***DESIGN FOR MISSING HISTORIC FEATURES******Recommended***

*Designing and installing a new interior feature or finish if the historic feature or finish is completely missing. This could include missing partitions, stairs, elevators, lighting*



*fixtures and wall coverings; or even entire rooms if all historic spaces, features and finishes are missing or have been destroyed by inappropriate "renovations." The design may be a restoration based on historical, pictorial and physical documentation; or be a new design that is compatible with the historic character of the building, district or neighbourhood.*

#### *Not Recommended*

Creating a false historical appearance because the replaced feature is based on insufficient physical, historical and pictorial documentation or on information derived from another building.

Introducing a new interior feature or finish that is incompatible with the scale, design, materials, colour and texture of the surviving interior features and finishes.

### **ALTERATIONS/ADDITIONS FOR THE NEW USE**

#### **Recommended**

*Accommodating service functions such as bathrooms, mechanical equipment and office machines required by the building's new use in secondary spaces such as first floor service areas or on upper floors.*

#### *Not Recommended*

Dividing rooms, lowering ceilings and damaging or obscuring character-defining features such as fireplaces, niches, stairways or alcoves so that a new use can be accommodated in the building.

#### **Recommended**

*Reusing decorative material or features that have had to be removed during the rehabilitation work including wall and baseboard trim, door molding, paneled doors and simple wainscoting; and relocating such material or features in areas appropriate to their historic placement.*

#### *Not Recommended*

Discarding historic material when it can be reused within the rehabilitation project or relocating it in historically inappropriate areas.

#### **Recommended**

*Installing permanent partitions in secondary spaces; removable partitions that do not destroy the sense of space should be installed when the new use requires the subdivision of character-defining interior spaces.*

#### *Not Recommended*

Installing permanent partitions that damage or obscure character-defining spaces, features or finishes.

#### **Recommended**

*Enclosing an interior stairway where required by code so that its character is retained. In many cases, glazed fire-rated walls may be used.*

#### *Not Recommended*

Enclosing an interior stairway with fire-rated construction so that the stairwell space or any character-defining features are destroyed.

#### **Recommended**

*Placing new code-required stairways or elevators in secondary and service areas of the historic building.*

#### *Not Recommended*

Radically changing, damaging or destroying character-defining spaces, features or finishes when adding new code-required stairways and elevators.

#### **Recommended**

*Creating an atrium or a light well to provide natural light when required for the new use in a manner that preserves character-defining interior spaces, features and finishes as well as the structural system.*

#### *Not Recommended*

Destroying character-defining interior spaces, features or finishes; or damaging the structural system in order to create an atrium or light well.



**Recommended**

*Adding a new floor if required for the new use in a manner that preserves character-defining structural features and interior spaces, features and finishes.*

**Not Recommended**

Inserting a new floor within a building that alters or destroys the fenestration; radically changes a character-defining interior space; or obscures, damages or destroys decorative detailing.

## **MECHANICAL SYSTEMS: Heating, air conditioning, electrical and plumbing**

The visible features of historic heating, lighting, air conditioning and plumbing systems may sometimes help define the overall historic character of the building and should thus be retained and repaired, whenever possible. The systems themselves (the compressors, boilers, generators and their ductwork, wiring and pipes) will generally either need to be upgraded, augmented or entirely replaced in order to accommodate the new use and to meet code requirements. Less frequently, individual portions of a system or an entire system are significant in the history of building technology; therefore, the identification of character defining features or historically significant systems should take place together with an evaluation of their physical condition early in project planning.

**Recommended**

Identifying, retaining and preserving visible features of early mechanical systems that are important in defining the overall historic character of the building such as radiators, vents, fans, grilles, plumbing fixtures, switchplates and lights.

**Not Recommended**

Removing or radically changing features of mechanical systems that are important in defining the overall historic character of the building so that, as a result, the character is diminished.

**Recommended**

Protecting and maintaining mechanical, plumbing and electrical systems and their features through cyclical cleaning and other appropriate measures.

**Not Recommended**

Failing to provide adequate protection of materials on a cyclical basis so that deterioration of mechanical systems and their visible features results.

**Recommended**

Preventing accelerated deterioration of mechanical systems by providing adequate ventilation of attics, crawlspaces and cellars so that moisture problems are avoided.

**Not Recommended**

Enclosing mechanical systems in areas that are not adequately ventilated so that deterioration of the systems results.

**Recommended**

Repairing mechanical systems by augmenting or upgrading system parts, such as installing new pipes and ducts; rewiring; or adding new compressors or boilers.

**Not Recommended**

Replacing a mechanical system or its functional parts when it could be upgraded and retained.

**Recommended**

Replacing in kind - or with compatible substitute material - those visible features of mechanical systems that are either extensively deteriorated or are missing when there are surviving prototypes such as ceiling fans, switchplates, radiators, grilles or plumbing fixtures.

**Not Recommended**

Installing a replacement feature that does not convey the same visual appearance.

The following work is boxed to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

#### ALTERATIONS/ADDITIONS FOR THE NEW USE

##### **Recommended**

*Installing a completely new mechanical system if required for the new use so that it causes the least alteration possible to the building's floor plan, the exterior elevations and the least damage to historic building material.*

##### **Not Recommended**

Installing a new mechanical system so that character-defining structural or interior features are radically changed, damaged or destroyed.

##### **Recommended**

*Installing the vertical runs of ducts, pipes and cables in closets, service rooms and wall cavities.*

##### **Not Recommended**

Installing vertical runs of ducts, pipes and cables in places where they will obscure character-defining features.

Concealing mechanical equipment in walls or ceiling in a manner that requires the removal of historic building material.

Installing "dropped" acoustical ceilings to hide mechanical equipment when this destroys the proportions of character-defining interior spaces.

##### **Recommended**

*Installing air conditioning units if required by the new use in such a manner that the historic materials and features are not damaged or obscured.*

##### **Not Recommended**

Cutting through features such as masonry walls in order to install air conditioning units.

##### **Recommended**

*Installing heating/air conditioning units in the window frames in such a manner that the sash and frames are protected. Window installations should be considered only when all other viable heating/cooling systems would result in significant damage to historic materials.*

##### **Not Recommended**

Radically changing the appearance of the historic building or damaging or destroying windows by installing heating/air conditioning units in historic window frames.

#### BUILDING SITE

The relationship between a historic building or buildings and landscape features within a property's boundaries - or the building site - helps to define the historic character and should be considered an integral part of overall planning for rehabilitation project work.

##### **Recommended**

Identifying, retaining and preserving buildings and their features as well as features of the site that are important in defining its overall historic character. Site features can include driveways, walkways, lighting, fencing, signs, benches, fountains, wells, terraces, canal systems, plants and trees, berms and drainage or irrigation ditches; and archaeological features that are important in defining the history of the site.

##### **Not Recommended**

Removing or radically changing buildings and their features or site features which are important in defining the overall historic character of the building site so that, as a result, the character is diminished.

##### **Recommended**

Retaining the historic relationship between buildings, landscape features and open space.

***Not Recommended***

Removing or relocating historic buildings or landscape features, thus destroying the historic relationship between buildings, landscape features and open space.

Removing or relocating historic buildings on a site or in a complex of related historic structures - such as a mill complex or farm - thus diminishing the historic character of the site or complex.

Moving buildings onto the site, thus creating a false historical appearance.

Lowering the grade level adjacent to a building to permit development of a formerly below-grade area such as a basement in a manner that would drastically change the historic relationship of the building to its site.

***Recommended***

Protecting and maintaining buildings and the site by providing proper drainage to assure that water does not erode foundation walls; drain toward the building; nor erode the historic landscape.

***Not Recommended***

Failing to maintain site drainage so that buildings and site features are damaged or destroyed; or, alternatively, changing the site grading so that water no longer drains properly.

***Recommended***

Minimizing disturbance of terrain around buildings or elsewhere on the site, thus reducing the possibility of destroying unknown archaeological materials.

***Not Recommended***

Introducing heavy machinery or equipment into areas where their presence may disturb archaeological materials.

***Recommended***

Surveying areas where major terrain alteration is likely to impact important archaeological sites.

***Not Recommended***

Failing to survey the building site prior to the beginning

of rehabilitation project work so that, as a result, important archaeological material is destroyed.

***Recommended***

Protecting, e.g. preserving in place known archaeological material whenever possible.

***Not Recommended***

Leaving known archaeological material unprotected and subject to vandalism, looting and destruction by natural elements such as erosion.

***Recommended***

Planning and carrying out any necessary investigation using professional archaeologists and modern archaeological methods when preservation in place is not feasible.

***Not Recommended***

Permitting unqualified project personnel to perform data recovery so that improper methodology results in the loss of important archaeological material.

***Recommended***

Protecting the building and other features of the site against arson and vandalism before rehabilitation work begins, i.e., erecting protective fencing and installing alarm systems that are keyed into local protection agencies.

***Not Recommended***

Permitting buildings and site features to remain unprotected so that plant materials, fencing, walkways, archaeological features, etc. are damaged or destroyed.

Stripping features from buildings and the site such as wood siding, iron fencing, masonry balustrades; or removing or destroying landscape features, including plant material.

***Recommended***

Providing continued protection of masonry, wood and architectural metals which comprise building and site features through appropriate surface treatments such as cleaning, rust removal, limited paint removal and re-application of protective

coating systems; and continued protection and maintenance of landscape features, including plant material.

*Not Recommended*

Failing to provide adequate protection of materials on a cyclical basis so that deterioration of building and site features results.

**Recommended**

Evaluating the overall condition of materials to determine whether more than protection and maintenance are required, that is, if repairs to building and site features will be necessary.

*Not Recommended*

Failing to undertake adequate measures to assure the preservation of building and site features.

**Recommended**

Repairing features of buildings and the site by reinforcing the historic materials. Repair will also generally include replacement in kind - with a compatible substitute material - of those extensively deteriorated or missing parts of features where there are surviving prototypes such as fencing and paving.

*Not Recommended*

Replacing an entire feature of the building or site such as a fence, walkway or driveway when repair of materials and limited replacement of deteriorated or missing parts are appropriate.

Using a substitute material for the replacement part that does not convey the visual appearance of the surviving part of the building or site feature or that is physically or chemically incompatible.

**Recommended**

Replacing in kind an entire feature of the building or site that is too deteriorated to repair - if the overall form and detailing are still evident - using the physical evidence to guide the new work. This could include an entrance or porch, walkway or fountain. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

*Not Recommended*

Removing a feature of the building or site that is unrepairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

The following work is boxed to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed

**DESIGN FOR MISSING HISTORIC FEATURES**

**Recommended**

*Designing and constructing a new feature of a building or site when the historic feature is completely missing, such as an outbuilding, terrace or driveway. It may be based on historical, pictorial and physical documentation; or be a new design that is compatible with the historic character of the building and site.*

*Not Recommended*

Creating a false historical appearance because the replaced feature is based on insufficient historical, pictorial and physical documentation.

Introducing a new building or site feature that is out of scale or otherwise inappropriate.

Introducing a new landscape feature of plant material that is visually incompatible with the site or that destroys site patterns or vistas.

**ALTERATIONS/ADDITIONS FOR THE NEW USE**

**Recommended**

*Designing new on-site parking, loading docks or ramps when required by the new use so that they are as unobtrusive as possible and assure the preservation of character-defining features of the site.*



**Not Recommended**

Placing parking facilities directly adjacent to historic buildings where automobiles may cause damage to the buildings or landscape features or be intrusive to the building site.

**Recommended**

*Designing new exterior additions to historic buildings or adjacent new construction which is compatible with the historic character of the site and which preserve the historic relationship between a building or buildings, landscape features and open space.*

**Not Recommended**

Introducing new construction onto the building site which is visually incompatible in terms of size, scale, design, materials, colour and texture of which destroys historic relationships on the site.

**Recommended**

*Removing non-significant buildings, additions or site features which detract from the historic character of the site.*

**Not Recommended**

Removing a historic building in a complex, a building feature or a site feature which is important in defining the historic character of the site.

tures can include streets, alleys, paving, walkways, street lights, signs, benches, parks and gardens and trees.

**Not Recommended**

Removing or radically changing those features of the district or neighbourhood which are important in defining the overall historic character so that, as a result, the character is diminished.

**Recommended**

Retaining the historic relationship between buildings and streetscape and landscape features such as a town square comprised of row houses and stores surrounding a communal park or open space.

**Not Recommended**

Destroying streetscape and landscape features by widening existing streets, changing paving material or introducing inappropriately located new streets or parking lots.

Removing or relocating historic buildings or features of the streetscape and landscape, thus destroying the historic relationship between buildings, features and open space.

**Recommended**

Protecting and maintaining the historic masonry, wood and architectural metals which comprise building and streetscape features, through appropriate surface treatments such as cleaning, rust removal, limited paint removal and re-application of protective coating systems; and protecting and maintaining landscape features, including plant material.

**Not Recommended**

Failing to provide adequate protection of materials on a cyclical basis so that deterioration of building, streetscape and landscape features results.

**Recommended**

Protecting buildings, paving, iron fencing, etc. against arson and vandalism before rehabilitation work begins by erecting protective fencing and installing alarm systems that are keyed into local protection agencies.

**DISTRICT / NEIGHBOURHOOD**

The relationship between historic buildings and streetscape and landscape features within a historic district or neighbourhood helps to define the historic character and therefore should always be a part of the rehabilitation plans.

**Recommended**

Identifying, retaining and preserving buildings streetscape and landscape features which are important in defining the overall historic character of the district or neighbourhood. Such fea-



*Not Recommended*

Permitting buildings to remain unprotected so that windows are broken and interior features are damaged.

Stripping features from buildings or the streetscape such as wood siding, iron fencing or terra-cotta balusters; or removing or destroying landscape features, including plant material.

*Recommended*

Evaluating the overall condition of building, streetscape and landscape materials to determine whether more than protection and maintenance are required, that is, if repairs to features will be necessary.

*Not Recommended*

Failing to undertake adequate measures to assure the preservation of building, streetscape and landscape features.

*Recommended*

Repairing features of the building, streetscape or landscape by reinforcing the historic materials. Repair will also generally include the replacement in kind - or with a compatible substitute material - of those extensively deteriorated or missing parts of features when there are surviving prototypes such as porch balustrades, paving materials or streetlight standards.

*Not Recommended*

Replacing an entire feature of the building, streetscape or landscape such as a porch, walkway or streetlight, when repair of materials and limited replacement of deteriorated or missing parts are appropriate.

Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the building, streetscape or landscape feature or that is physically or chemically incompatible.

*Recommended*

Replacing in kind an entire feature of the building, streetscape or landscape that is too deteriorated to repair - when the overall form and detailing are still evident - using the physical evidence to guide the new work. This could include a storefront, a walkway or a garden. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

*Not Recommended*

Removing a feature of the building, streetscape or landscape that is unrepairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

The following work is boxed to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed

*DESIGN FOR MISSING HISTORIC FEATURES**Recommended*

*Designing and constructing a new feature of the building, streetscape or landscape when the historic feature is completely missing, such as row house steps, a porch, streetlight or terrace. It may be a restoration based on historical, pictorial and physical documentation; or be a new design that is compatible with the historic character of the district or neighbourhood.*

*Not Recommended*

Creating a false historical appearance because the replaced feature is based on insufficient historical, pictorial and physical documentation.

Introducing a new building, streetscape or landscape feature that is out of scale or otherwise inappropriate to the setting's historic character, e.g., replacing picket fencing with chain link fencing.

*ALTERATIONS/ADDITIONS FOR THE NEW USE**Recommended*

*Designing required new parking so that it is as unobtrusive as possible, i.e., on side streets or at the rear of buildings. "Shared" parking should also be planned so that several businesses can utilize one parking area as opposed to introducing random, multiple lots.*

*Not Recommended*

Placing parking facilities directly adjacent to historic buildings which cause the removal of historic plantings, re-location of paths and walkways or blocking of alleys.

*Recommended*

*Designing and constructing new additions to historic buildings when required by the new use. New work should be compatible with the historic character of the district or neighbourhood in terms of size, scale, design, material, colour and texture.*

*Not Recommended*

Introducing new construction into a historic district that is visually incompatible or that destroys historic relationships within the district or neighbourhood.

*Recommended*

*Removing non-significant buildings, additions or streetscape and landscape features which detract from the historic character of the district or the neighbourhood.*

*Not Recommended*

Removing a historic building, feature or landscape or streetscape feature that is important in defining the overall historic character of the district or the neighbourhood.

Although the work in these sections is quite often an important aspect of rehabilitation projects, it is usually not part of the overall process of preserving character-defining features (maintenance, repair, replacement); rather, such work is assessed for its potential negative impact on the building's historic character. For this reason, particular care must be taken not to obscure, radically change, damage or destroy character-defining features in the process of rehabilitation work to meet new use requirements.

**HEALTH AND SAFETY CODE REQUIREMENTS**

As a part of the new use, it is often necessary to make modifications to a historic building so that it can comply with current health, safety and code requirements. Such work needs to be carefully planned and undertaken so that it does not result in a loss of character-defining spaces, features and finishes.

*Recommended*

Identifying the historic building's character-defining spaces, features and finishes so that code-required work will not result in their damage or loss.

*Not Recommended*

Undertaking code-required alterations to a building or site before identifying those spaces, features or finishes which are character defining and must therefore be preserved.

*Recommended*

Complying with health and safety codes, including seismic codes and barrier-free access requirements, in such a manner that character-defining spaces, features and finishes are preserved.

*Not Recommended*

Altering, damaging or destroying character-defining spaces, features and finishes while making modifications to a building or site to comply with safety codes.

*Recommended*

Working with local code officials to investigate alternative life safety measures or variance available under some codes so that alterations and additions to historic buildings can be avoided.

*Not Recommended*

Making changes to historic buildings without first seeking alternatives to code requirements.

***Recommended***

Providing barrier-free access through removable or portable, rather than permanent, ramps.

***Not Recommended***

Installing permanent ramps that damage or diminish character-defining features.

***Recommended***

Providing seismic reinforcement to a historic building in a manner that avoids damaging the structural system and character-defining features.

***Not Recommended***

Reinforcing a historic building using measures that damage or destroy character-defining structural and other features.

***Recommended***

Upgrading historic stairways and elevators to meet health and safety codes in a manner that assures their preservation, i.e., so that they are not damaged or obscured.

***Not Recommended***

Damaging or obscuring historic stairways and elevators or altering adjacent spaces in the process of doing work to meet code requirements.

***Recommended***

Installing sensitively designed fire suppression systems, such as a sprinkler system for wood frame mill buildings, instead of applying fire-resistant sheathing to character-defining features.

***Not Recommended***

Covering character-defining wood features with fire-resistant sheathing which results in altering their visual appearance.

***Recommended***

Applying fire-retardant coatings, such as intumescent paints, which expand during fire to add thermal protection to steel.

***Not Recommended***

Using fire-retardant coatings if they damage or obscure character defining features.

***Recommended***

Adding a new stairway or elevator to meet health and safety codes in a manner that preserves adjacent character-defining features and spaces.

***Not Recommended***

Radically changing, damaging or destroying character-defining spaces, features or finishes when adding a new code-required stairway or elevator.

***Recommended***

Placing a code-required stairway or elevator that cannot be accommodated within the historic building in a new exterior addition. Such an addition should be located at the rear of the building or on an inconspicuous side; and its size and scale limited in relationship to the historic building.

***Not Recommended***

Constructing a new addition to accommodate code-required stairs and elevators on character-defining elevations highly visible from the street; or where it obscures, damages or destroys character-defining features.

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**ENERGY RETROFITTING**

Some character-defining features of a historic building or site such as cupolas, shutters, transoms, skylights, sun rooms, porches and plantings also play a secondary energy conserving role. Therefore, prior to retrofitting historic buildings to make them more energy efficient, the first step should always be to identify and evaluate the existing historic features to assess their

inherent energy conserving potential. If it is determined that retrofitting measures are necessary, then such work needs to be carried out with particular care to ensure that the building's historic character is preserved in the process of rehabilitation.

#### *DISTRICT/NEIGHBOURHOOD*

##### ***Recommended***

Maintaining those existing landscape features which moderate the effects of the climate on the setting such as deciduous trees, evergreen wind-blocks and lakes or ponds.

##### ***Not Recommended***

Stripping the setting of landscape features and landforms so that the effects of the wind, rain and the sun result in accelerated deterioration of historic materials.

#### *BUILDING SITE*

##### ***Recommended***

Retaining plant materials, trees and landscape features, especially those which perform passive solar energy functions such as sun shading and wind breaks.

##### ***Not Recommended***

Removing plant materials, trees and landscape features so that they no longer perform passive solar energy functions.

##### ***Recommended***

Installing freestanding solar collectors in a manner that preserves the historic property's character-defining features.

##### ***Not Recommended***

Installing freestanding solar collectors that obscure, damage or destroy historic landscape or archaeological features.

##### ***Recommended***

Designing attached solar collectors, including solar greenhouses, so that the character-defining features of the property are preserved.

##### ***Not Recommended***

Locating solar collectors where they radically change the property's appearance; or damage or destroy character-defining features.

#### *MASONRY/WOOD/ARCHITECTURAL METALS*

##### ***Recommended***

Installing thermal insulation in attics and in unheated cellars and crawlspaces to increase the efficiency of the existing mechanical systems.

##### ***Not Recommended***

Applying ureaformaldehyde foam or any other thermal insulation with a water content into wall cavities in an attempt to reduce energy consumption.

##### ***Recommended***

Installing insulating material on the inside of masonry walls to increase energy efficiency where there is no character-defining interior molding around the window or other interior architectural detailing.

##### ***Not Recommended***

Resurfacing historic building materials with more energy efficient but incompatible materials, such as covering historic masonry with exterior insulation.

##### ***Recommended***

Installing passive solar devices such as a glazed "trombe" wall on a rear or inconspicuous side of the historic building.

*Not Recommended*

Installing passive solar devices such as an attached glazed "trombe" wall on primary or other highly visible elevations; or where historic material must be removed or obscured.

*ROOFS**Recommended*

Placing solar collectors on non-character-defining roofs or roofs of non-historic adjacent buildings.

*Not Recommended*

Placing solar collectors on roofs when such collectors change the historic roofline or obscure the relationship of the roof to character-defining roof features such as dormers, skylights and chimney.

*WINDOWS**Recommended*

Utilizing the inherent energy conserving features of a building by maintaining windows and louvered blinds in good operable condition for natural ventilation.

*Not Recommended*

Removing historic shading devices rather than keeping them in an operable condition.

*Recommended*

Improving thermal efficiency with weatherstripping, storm windows, caulking, interior shades and, if historically appropriate, blinds and awnings.

*Not Recommended*

Replacing historic multi-paned sash with new thermal sash utilizing false muntins.

*Recommended*

Installing interior storm windows with air-tight gaskets, ventilating holes and/or removable clips to insure proper maintenance and to avoid condensation damage to historic windows.

*Not Recommended*

Installing interior storm windows that allow moisture to accumulate and damage the window.

*Recommended*

Installing exterior storm windows which do not damage or obscure the windows and frames.

*Not Recommended*

Installing new exterior storm windows which are inappropriate in size or colour, which are inoperable.

Replacing windows or transoms with fixed thermal glazing or permitting windows and transoms to remain inoperable rather than utilizing them for their energy conserving potential.

*Recommended*

Considering the use of lightly tinted glazing on non-character-defining elevations if other energy retrofitting alternatives are not possible.

*Not Recommended*

Using tinted or reflective glazing on character-defining or other conspicuous elevations.

*ENTRANCES AND PORCHES**Recommended*

Utilizing the inherent energy conserving features of a building by maintaining porches and double vestibule entrances, in good condition so that they can retain heat or block the sun and provide natural ventilation.



***Not Recommended***

Enclosing porches located on character-defining elevations to create passive solar collectors or airlock vestibules. Such enclosures can destroy the historic appearance of the building.

***INTERIOR FEATURES******Recommended***

Retaining historic interior shutters and transoms for their inherent energy conserving features.

***Not Recommended***

Removing historic interior features which play a secondary energy conserving role.

***NEW ADDITIONS TO HISTORIC BUILDINGS******Recommended***

Placing new additions that have an energy conserving function such as a solar greenhouse on non-character-defining elevations.

***Not Recommended***

Installing new additions such as multi-story solar greenhouse additions which obscure, damage, destroy character-defining features.

***MECHANICAL SYSTEMS******Recommended***

Installing thermal insulation in attics and in unheated cellars and crawlspaces to conserve energy.

***Not Recommended***

Applying ureaformaldehyde foam or any other thermal

insulation with a water content or that may collect moisture into wall cavities.

***NEW ADDITIONS TO HISTORIC BUILDINGS***

An attached exterior addition to a historic building expands its "outer limits" to create a new profile. Because such expansion has the capability to radically change the historic appearance, an exterior addition should be considered only after it has been determined that the new use cannot be successfully met by altering non-character-defining interior spaces. If the new use cannot be met in this way, then an attached exterior addition is usually an acceptable alternative. New additions should be designed and constructed so that the character-defining features of the historic building are not radically changed, obscured, damaged or destroyed in the process of rehabilitation. New design should always be clearly differentiated so that the addition does not appear to be part of the historic resource.

***Recommended***

Placing functions and services required for the new use in non-character-defining interior spaces rather than installing a new addition.

***Not Recommended***

Expanding the size of the historic building by constructing a new addition when the new use could be met by altering non-character-defining interior spaces.

***Recommended***

Constructing a new addition so that there is the least possible loss of historic materials and so that character-defining features are not obscured, damaged or destroyed.

***Not Recommended***

Attaching a new addition so that the character-defining features of the historic building are obscured, damaged or destroyed.

***Recommended***

Locating the attached exterior addition at the rear or on

an inconspicuous side of a historic building; and limiting its size and scale in relationship to the historic building.

*Not Recommended*

Designing a new addition so that its size and scale in relation to the historic building are out of proportion, thus diminishing the historic character.

**Recommended**

Designing new additions in a manner that makes clear what is historic and what is new.

*Not Recommended*

Duplicating the exact form, material, style and detailing of the historic building in the new addition so that the new work appears to be part of the historic building.

Imitating a historic style or period of architecture in new additions, especially for contemporary uses such as drive-in banks or garages.

**Recommended**

Considering the attached exterior addition both in terms of the new use and the appearance of other buildings in the historic district or neighbourhood. Design for the new work may be contemporary or may reference design motifs from the historic building. In either case, it should always be clearly differentiated from the historic building and be compatible in terms of mass, materials, relationship of solids to voids and colour.

*Not Recommended*

Designing and constructing new additions that result in the diminution or loss of the historic character of the resource, including its design, materials, workmanship, location or setting.

Using the same wall plane, roof line, cornice height, materials, siding lap or window type to make additions appear to be a part of the historic building.

**Recommended**

Placing new additions such as balconies and greenhouses on non-character-defining elevations and limiting the size and scale in relationship to the historic building.

*Not Recommended*

Designing new additions such as multi-story greenhouse additions that obscure, damage or destroy character defining features of the historic building.

**Recommended**

Designing additional stories, when required for the new use, that are set back from the wall plane and are as inconspicuous as possible when viewed from the street.

*Not Recommended*

Constructing additional stories so that the historic appearance of the building is radically changed.

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## READING LIST AND ORDERING INFORMATION

### **PRESERVATION TAX Incentives Program Information**

Tax Incentives for Rehabilitating Historic Buildings. Program leaflet. Explains the Federal tax incentives available to owners who rehabilitate commercial historic structures. Includes an outline of the certification process, program regulations and a list of State Historic Preservation Officers. 12 pages. May, 1982.

Preservation Briefs are prepared for property owner, developers or Federal agency managers to assist in evaluating and resolving common preservation and repair problems. The briefs are often given to preservation tax incentives program applicants to help explain recommended historic preservation method and approaches in the rehabilitation of historic buildings. Copies, except where noted, are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. GPO prices are subjects to change without notice.

Preservation Briefs: 1. The Cleaning and Waterproof Coating of Masonry Buildings by Robert C. Mack, AIA. Provides guidance on the techniques of cleaning and waterproofing and explains the consequences of their inappropriate use. 4 pages. 5 illus. November, 1975.

Preservation Briefs: 2. Repointing Mortar Joints in Historic Brick Buildings by Robert C. Mack, AIA, de Teel Patterson Tiller and James S. Askins. Provides update on appropriate materials and methods for repointing historic buildings. 8 pages. 12 illus. August, 1980. GPO Stock Number 024-016-0014806: 1-100 copies, \$2.25 each; multiples of 100, \$22.

Preservation Briefs: 3. Conserving Energy in Historic Buildings by Baird M. Smith, AIA. Provides information on materials and techniques to consider or avoid when undertaking weatherization and energy conservation measures in historic buildings. 8 pages. 8 illus. April, 1978. GPO Stock Number: 024-016-0013-6: 1-100 copies, \$2.25 each; multiples of 100, \$22.

Preservation Briefs: 4. Roofing for Historic Buildings by Sarah M. Sweetser. Provides a brief historic of the most commonly used roofing materials in America. Presents a sound preservation approach to roof repair, roof replacement and the use of alternative roofing materials. 8 pages. 15 illus. February, 1978. GPO Stock Number: 024-016-00102-8; 1-100 copies, \$2.25 each; multiples of 100, \$22.

Preservation Briefs: 5. The Preservation of Historic Adobe Buildings. Provides information on the traditional materials and construction of adobe buildings and the causes of adobe deterioration. Makes recommendations for preserving historic adobe buildings. 8 pages. 10 illus. August, 1978.

Preservation Briefs: 6. Dangers of Abrasive Cleaning to Historic Buildings by Anne E. Grimmer. Cautions against the use of sandblasting to clean various buildings and suggests measures to mitigate the effects of improper cleaning. Explains the limited circumstances under which abrasive cleaning may be appropriate. 8 pages. 10 illus. June, 1979. GPO Stock Number: 024-016-00112-5: 1-100 copies, \$2.25 each, multiples of 100, \$22.

Preservation Briefs: 7. The Preservation of Historic Glazed Architectural Terra-Cotta by de Teel Patterson Tiller. Discusses deterioration problems that commonly occur with terra-cotta and provides methods for determining the extent of such deterioration. Makes recommendations for maintenance and repair and suggests appropriate replacement materials. 8 pages. 11 illus. June, 1979. GPO Stock Number: 024-016-00115-0: 1-100 copies, \$2.25 each; multiples of 100, \$22. Preservation Briefs: 8. Aluminum and Vinyl Siding on Historic Buildings by John H. Myers. Discusses esthetic and technical

considerations surrounding use of these substitute replacement materials. 8 pages. 11 illus. October, 1979.

Preservation Briefs: 9. The Repair of Historic Wooden Windows by John H. Myers. Provides useful information on evaluating and repairing historic wooden windows found in typical rehabilitation projects. Emphasizes practical technology for homeowners or developers. 8 pages. 10 illus. January, 1981. GPO Stock Number: 024-016-00147-8: 1-100 copies, \$2.25 each; multiples of 100, \$22.

Preservation Briefs: 10. Exterior Paint Problems on Historic Woodwork by Kay D. Weeks and David W. Look, AIA. Identifies and describes common types of paint surface conditions and failures. Provides guidance on preparing historic woodwork for repainting, including limited and total paint removal. 12 pages. 14 illus. November, 1982. GPO Stock Number: 024-005-00842-0: \$2.25 each.

Preservations Briefs: 11. Rehabilitating Historic Storefronts by H. Ward Jandl. Explores the role of the storefront in historic buildings and provides guidance on rehabilitation techniques for storefronts as well as compatible new storefront designs. 12 pages. 12 illus. November 1982. GPO Stock Number: 024-005-00843-8: \$2.25 each.

Technical Reports address in detail technical problems confronted by architects, engineers, government officials and other technicians involved with the preservation of historic buildings. Copies, except where noted, are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. GPO prices are subject to change without notice.

Access to Historic Buildings for the Disabled: Suggestions for Planning and Implementation by Charles Parrott. Addresses the special concerns of improved access by disabled persons to historic buildings, as well as legal requirements and compliance planning procedures. Also examines techniques to make programs and services housed in historic buildings accessible in lieu of architectural changes. 92 pages. 42 illus. 1980. GPO Stock Number: 024-016-00149-4: \$5.50.

Cyclical Maintenance for Historic Buildings by J. Henry Chambers, AIA. Provides a step-by-step process for building managers, architects and others involved in the routine maintenance of historic properties. 125 pages. 1976. GPO Stock Number: 024-005-00637-1: \$6.50.

Directory of Historic Preservation Easement Organizations compiled by Charles E. Fisher, William G. MacRostie and Christopher A. Sowick. Lists over 185 organizations throughout the nation who are willing to accept historic preservation easements. 23 pages. 3 illus. Ref., December 1981.

Epoxies for Wood Repairs in Historic Buildings by Morgan W. Phillips and Judith E. Selwyn. Presents research findings on the formulations of epoxy consolidants and patching compounds for use of wooden elements in preservation projects, including case study applications. 72 pages. 43 illus. Appendix. 1978. GPO Stock Number: 024-016-00095-1: \$5.00.

Exterior Cleaning of Historic Masonry Buildings by Norman R. Weiss. Discusses various methods of cleaning and the complex factors to consider before selecting a suitable method. Intended primarily for architects, conservators and other professionals responsible for the preparation of specifications and development of agency-wide cleaning programs. 18 pages. Selected bibliography. 1977. Gaslighting in America: A Guide for Historic Preservation by Denys Peter Myers. Surveys interior and exterior gaslighting fixtures used in America, providing histories of the major manufacturing firms and a listing of the charter dates for individual and city gas companies. 248 pages. 120 illus. Appendix. Bibliography. 1978. GPO Stock Number: 024-016-00094-3: \$8.50.

Metal in America's Historic Buildings: Uses and Preservation Methods by Margot Gayle and David W. Look, AIA (Part I); and John Waite (Part II). Concentrates on the historic uses of such architectural metals as lead, tin, zinc, copper, nickel, iron, steel and aluminum (Part I). Also discusses the sources of metal deterioration and suggests appropriate preservation and maintenance techniques, addressing each metal individually (Part II). 170 pages. 180 illus. 1980. GPO Stock Number: 024-016-00143-5: \$7.00.

Moving Historic Buildings by John Obed Curtis. Discusses the limited circumstances under which a historic masonry or frame building should be moved; establishes a methodology for planning, research and recording prior to the move; and addresses the actual siting, foundation construction, building reassembly and restoration after a successful move has taken place. 56 pages. 47 illus. Selected bibliography. 1979.

Photogrammetric Recording of Cultural Resources by Perry E. Borchers. Describes the basic principles of photogrammetry and their application to the recording of cultural resources. 38 pages. 28 illus. 1977.

Rectified Photography and Photo Drawings for Historic Preservation by J. Henry Chambers, AIA. Presents a method developed for the preparation of photographic working drawings and photodocumentation. Intended for architects. 37 pages. 13 illus. 1973. GPO Stock Number: 024-016-00124-9: \$4.75.

Rehabilitation of Historic Buildings: An Annotated Bibliography by Frederic E. Kley. Cites readily available literature on various aspects of building rehabilitation with chapters on economics, building regulations, technical preservation topics and selected case studies. 21 pages. 1980. GPO Stock Number: 024-016-00130-3: \$3.50.

Wallpapers in Historic Preservation by Catherine Lynn Frangiamore. Surveys the technology, styles and uses of wallpapers in America with suggestions for using wallpaper within a restoration project. 56 pages. 39 illus. Appendices. 1977. GPO Stock Number: 024-005-00685-1: \$5.00.

X-Ray Examination of Historic Structures by David M. Hart. Discusses a method for investigating a building's fabric by nondestructive means. Intended for architects, conservators and other professionals. 24 pages. 19 illus. 1975.

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## TPS PUBLICATIONS: OUTSIDE THE GOVERNMENT PRINTING OFFICE

Some of the publications TPS has developed have been printed by the private sector and are only available from these non-governmental sources. The following list includes the sources' addresses:

Energy Conservation and Solar Energy for Historic Buildings: Guidelines for Appropriate Designs. Prepared for Technical Preservation Services, National Park Service, by Thomas Vonier Associates, Inc. funded by the U.S. Department of Energy. Provides design guidance on energy conservation measures and solar energy applications for historic buildings. 24 pages. 28 illus. November 1981. Available for \$6.95, prepaid, from: The National Center for Architecture and Urbanism, 1927 S Street, N.W., Suite 300, Washington, D.C. 20009.

Respectful Rehabilitations: Answers to Your Questions on Historic Buildings. Prepared by Technical Preservation Services, National Park Service, U.S. Department of the Interior and published by the Preservation Press of the National Trust for

Historic Preservation. Provides answers to 150 questions which are often posed in the course of rehabilitating historic structures. Topics covered range from paint, wood, masonry, metals and interior features to mechanical systems and health and safety codes. 185 pages. 150 illus. September, 1982. Available for \$9.95 plus \$2.50 for postage and handling from: Preservation Shops, 1600 H. Street, N.W., Washington, D.C. 20006.





CULTURAL RESOURCES MANAGEMENT  
NPS-28

APPENDIX C:  
SECRETARY OF THE INTERIOR'S  
**STANDARDS AND GUIDELINES**  
FOR ARCHAEOLOGY AND HISTORIC PRESERVATION

DEPARTMENT OF THE INTERIOR  
National Park Service

Archaeology and Historic Preservation;  
Secretary of the Interior's Standards and Guidelines

AGENCY: National Park Service, Interior

RELEASE No. 4 - Draft  
JULY 1991

**SUMMARY:**

This notice sets forth the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation. These standards and guidelines are not regulatory and do not set or interpret agency policy. They are intended to provide technical advice about archaeological and historic preservation activities and methods.

**DATE:**

These standards and Guidelines are effective on September 29, 1983.

**FOR FURTHER INFORMATION CONTACT:**

Lawrence E. Aten, Chief, Interagency Resources Division, National Park Service, United States Department of the Interior, Washington, D.C. 20240 (202-343-9500). A Directory of Technical Information listing other sources of supporting information is available from the National Park Service.

**PURPOSE**

The proposed Standards and the philosophy on which they are based result from nearly twenty years of intensive preservation activities at the Federal, State, and local levels.

The purposes of the Standards are:

- To organize the information gathered about preservation activities.
- To describe results to be achieved by Federal agencies, States, and others when planning for the identification, evaluation, registration and treatment of historic properties.
- To integrate the diverse efforts of many entities performing historic preservation into a systematic effort to preserve our nation's cultural heritage.

**USES OF THE STANDARDS**

The following groups or individuals are encouraged to use these Standards:

Federal agency personnel responsible for cultural resource management pursuant to Section 110 of the National Historic Preservation Act, as amended, in areas under Federal jurisdic-

tion. A separate series of guidelines advising Federal agencies on their specific historic preservation activities under Section 110 is in preparation.

State Historic Preservation Offices responsible under the National Historic Preservation Act, as amended, for making decisions about the preservation of historic properties in their States in accordance with appropriate regulations and the Historic Preservation Fund Grants Management Manual. The State Historic Preservation Offices serve as the focal point for preservation planning and act as a central state-wide repository of collected information.

Local governments wishing to establish a comprehensive approach to the identification, evaluation, registration and treatment of historic properties within their jurisdictions.

Other individuals and organizations needing basic technical standards and guidelines for historic preservation activities.

**ORGANIZATION**

This material is organized in three sections: Standards; Guidelines; and recommended technical sources, cited at the end of each set of guidelines. Users of this document are expected to consult the recommended technical sources to obtain guidance in specific cases.

**REVIEW OF THE STANDARDS AND GUIDELINES**

The Secretary of the Interior's Standards for Rehabilitation have recently undergone extensive review and their guidelines made current after 5 years of field use. Users and other interested parties are encouraged to submit written comments on the utility of these Standards and Guidelines except for the Rehabilitation Standards mentioned above. This edition will be thoroughly reviewed by the National Park Service (including consultation with Federal and State agencies), after the end of its first full year of use and any necessary modifications will be made. Subsequent reviews are anticipated as needed. Comments should be sent to Chief, Interagency Resources Division, National Park Service, United States Department of the Interior, Washington, D.C. 20240.

## SELECTED CONTENTS FROM NPS-28, APPENDIX C

Preservation Planning  
     Standards  
     Guidelines (omitted)  
 Identification  
     Standards  
     Guidelines (omitted)  
 Evaluation  
     Standards  
     Guidelines (omitted)  
 Registration  
     Standards  
     Guidelines (omitted)  
 Historical Documentation  
     Standards  
     Guidelines (omitted)  
 Architectural and Engineering Documentation  
     Standards  
     Guidelines (omitted)  
 Archaeological Documentation  
     Standards  
     Guidelines (omitted)  
 Historic Preservation Projects  
     Standards  
 Preservation Terminology

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 SECRETARY OF THE INTERIOR'S  
 STANDARDS FOR PRESERVATION  
 PLANNING

Preservation planning is a process that organizes preservation activities (identification, evaluation, registration and treatment of historic properties) in a logical sequence. The Standards for Planning discuss the relationship among these activities while the remaining activity standards consider how each activity should be carried out. The Professional Qualifications Standards discuss the education and experience required to carry out various activities.

The Standards for Planning outline a process that determines when an area should be examined for historic properties, whether an identified property is significant, and how a significant property should be treated.

Preservation planning is based on the following principles:

- Important historic properties cannot be replaced if they are destroyed. Preservation planning provides for conservative use of these properties, preserving them in place and avoiding harm when possible and altering or destroying properties only when necessary.
- If planning for the preservation of historic properties is to have positive effects, it must begin before the identification of all significant properties has been completed. To make responsible decisions about historic properties, existing information must be used to the maximum extent and new information must be acquired as needed.
- Preservation planning includes public participation. The planning process should provide a forum for open discussion of preservation issues. Public involvement is most meaningful when it is used to assist in defining values of properties and preservation planning issues, rather than when it is limited to review of decisions already made. Early and continuing public participation is essential to the broad acceptance of preservation planning decisions.

Preservation planning can occur at several levels or scales; in a project area; in a community; in a State as a whole; or in the scattered or contiguous landholdings of a Federal agency. Depending on the scale, the planning process will involve different segments of the public and professional communities and the resulting plans will vary in detail. For example, a State preservation plan will likely have more general recommendations than a plan for a project area or a community. The planning process described in these Standards is flexible enough to be

used at all levels while providing a common structure which promotes coordination and minimizes duplication of effort. The Guidelines for Preservation Planning contain additional information about how to integrate various levels of planning.

#### **STANDARD I.**

##### **Preservation Planning Establishes Historic Contexts**

Decisions about the identification, evaluation, registration and treatment of historic properties are most reliably made when the relationship of individual properties to other similar properties is understood. Information about historic properties representing aspects of history, architecture, archaeology, engineering and culture must be collected and organized to define these relationships. This organizational framework is called "historic context". The historic context organizes information based on a cultural theme and its geographical and chronological limits. Contexts describe the significant broad patterns of development in an area that may be represented by historic properties. The development of historic contexts is the foundation for decisions about identification, evaluation, registration and treatment of historic properties.

#### **STANDARD II.**

##### **Preservation Planning Uses Historic Contexts to Develop Goals and Priorities for the Identification, Evaluation, Registration and Treatment of Historic Properties**

A series of preservation goals is systematically developed for each historic context to ensure that the range of properties representing the important aspects of each historic context is identified, evaluated and treated. Then priorities are set for all goals identified for each historic context. The goals with assigned priorities established for each historic context are integrated to produce a comprehensive and consistent set of goals and priorities for all historic contexts in the geographical area of a planning effort.

The goals for each historic context may change as new information becomes available. The overall set of goals and priorities are then altered in response to the changes in the goals and priorities for the individual historic contexts.

Activities undertaken to meet the goals must be designed to deliver a usable product within a reasonable period of time. The scope of the activity must be defined so the work can be completed with available budgeted program resources.

#### **STANDARD III.**

##### **The Results of Preservation Planning Are Made Available for Integration into Broader Planning Processes**

Preservation of historic properties is one element of larger planning processes. Planning results, including goals and priorities, information about historic properties, and any planning documents, must be transmitted in a usable form to those responsible for other planning activities. Federally mandated historic preservation planning is most successfully integrated into project management planning at an early stage. Elsewhere, this integration is achieved by making the results of preservation planning available to other governmental planning bodies and to private interests whose activities affect historic properties.

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### **SECRETARY OF THE INTERIOR'S STANDARDS FOR IDENTIFICATION**

Identification activities are undertaken to gather information about historic properties in an area. The scope of these activities will depend on: existing knowledge about properties; goals for survey activities developed in the planning process; and current management needs.

#### **STANDARD I.**

##### **Identification of Historic Properties is Undertaken to the Degree Required to Make Decisions**

Archival research and survey activities should be designed to gather the information necessary to achieve defined preservation goals. The objectives, chosen methods and techniques, and expected results of the identification activities are specified in a research design. These activities may include archival research and other techniques to develop historic contexts, sampling an area to gain a broad understanding of the kinds of properties it contains, or examining every property in an area as a basis for property specific divisions. Where possible, use of quantitative methods is important because it can produce an estimate, whose reliability may be assessed, of the kinds of historic properties that may be present in the studied area. Identification activities should use a search procedure consistent with the management needs for information and the character of the



area to be investigated. Careful selection of methods, techniques and level of detail is necessary so that the gathered information will provide a sound basis for making decisions.

## **STANDARD II.**

### **Results of Identification Activities are Integrated into the Preservation Planning Process**

Results of identification activities are reviewed for their efforts on previous planning data. Archival research or field survey may refine the understanding of one or more historic contexts and may alter the need for additional survey or study of particular property types. Incorporation of the results of these activities into the planning process is necessary to ensure that the planning process is always based on the best available information.

## **STANDARD III.**

### **Identification Activities Include Explicit Procedures for Record-Keeping and Information Distribution**

Information gathered in identification activities is useful in other preservation planning activities only when it is systematically gathered and recorded, and made available to those responsible for preservation planning. The results of identification activities should be reported in a format that summarizes the design and methods of the survey, provides a basis for others to review the results, and states where information on identified properties is maintained. However, sensitive information, like the location of fragile resources, must be safeguarded from general public distribution.

## **RECOMMENDED SOURCES OF TECHNICAL INFORMATION**

Guidelines for Local Surveys: A Basis for Preservation Planning. Anne Derry, H. Ward Jandl, Carol Shull and Jan Thorman. National Register Division, U.S. Department of the Interior, 1978, Washington D.C. Available through the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. GPO stock number 024-016-00089-7. General guidance about designing and carrying out community surveys.

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## **SECRETARY OF THE INTERIOR'S STANDARDS FOR EVALUATION**

Evaluation is the process of determining whether identified properties meet defined criteria of significance and therefore should be included in an inventory of historic properties determined to meet the criteria. The criteria employed vary depending on the inventory's use in resource management.

## **STANDARD I.**

### **Evaluation of the Significance of Historic Properties Uses Established Criteria**

The evaluation of historic properties employs criteria to determine which properties are significant. Criteria should therefore focus on historical, architectural, archaeological, engineering and cultural values, rather than on treatments. A statement of the minimum information necessary to evaluate properties against the criteria should be provided to direct information gathering activities.

Because the National Register of Historic Places is a major focus of preservation activities on the Federal, State and local levels, the National Register criteria have been widely adopted not only as required for Federal purposes, but for State and local inventories as well. The National Historic Landmark criteria and other criteria used for inclusion of properties in State historic site files are other examples of criteria with different management purposes.

## **STANDARD II.**

### **Evaluation of Significance Applies the Criteria Within Historic Contexts**

Properties are evaluated using a historic context that identifies the significant patterns that properties represent and defines expected property types against which individual properties may be compared. Within this comparative framework, the criteria for evaluation take on particular meaning with regard to individual properties.

**STANDARD III.****Evaluation Results in A List or Inventory of Significant Properties That is Consulted in Assigning Registration and Treatment Priorities**

The evaluation process and the subsequent development of an inventory of significant properties in an on-going activity. Evaluation of the significance of a property should be completed before registration is considered and before preservation treatments are selected. The inventory entries should contain sufficient information for subsequent activities such as registration or treatment of properties, including an evaluation statement that makes clear the significance of the property within one or more historic contexts.

**STANDARD IV.****Evaluation Results Are Made Available to the Public**

Evaluation is the basis of registration and treatment decisions. Information about evaluation decisions should be organized and available for use by the general public and by those who take part in decisions about registration and treatment. Use of appropriate computer-assisted data bases should be a part of the information dissemination effort. Sensitive information, however, must be safeguarded from general public distribution.

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**SECRETARY OF THE INTERIOR'S  
STANDARDS FOR REGISTRATION**

Registration is the formal recognition of properties evaluated as significant. Preservation benefits provided by various registration programs range from honorific recognition to prohibition of demolition or alteration of included properties. Some registration programs provide recognition and other broad benefits while other programs authorize more specific forms of protection.

**STANDARD I.****Registration Is Conducted According To Stated Procedures**

Registration of historic properties in the National Register of Historic Places must be done in accordance with the Na-

tional Register regulations published in the Code of Federal Regulations, 30 CFR 60. Registration for other list or purposes follow an established process that is understood by the public, particularly by those interests that may be affected by registration.

**STANDARD II.****Registration Information Locates, Describes and Justifies the Significance and Physical Integrity of a Historic Property**

Registers are used for planning, research and treatment. They must contain adequate information for users to locate a property and understand its significance. Additional information may be appropriate depending on the intended use of the register.

**STANDARD III.****Registration Information is Accessible to the Public**

Information should be readily available to the public and to government agencies responsible for the preservation of historic properties and for other planning needs.

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**SECRETARY OF THE INTERIOR'S  
STANDARDS FOR HISTORICAL  
DOCUMENTATION**

Historical documentation provides important information related to the significance of a property for use by historians, researchers, preservationists, architects, and historical archaeologists. Research is used early in planning to gather information needed to identify and evaluate properties. (These activities are discussed in the Standards and Guidelines for Preservation Planning and the Standards and Guidelines for Identification). Historical documentation is also a treatment that can be applied in several ways to properties previously evaluated as significant; it may be used in conjunction with other treatment activities (as the basis for rehabilitation plans or interpretive programs, for example) or as a final treatment to preserve information in cases of threatened property destruction. These Standards concern the use of research and documentation as a treatment.

**STANDARD I.****Historical Documentation Follows a Research Design that Responds to Needs Identified in the Planning Process**

Historical documentation is undertaken to make a detailed record of the significance of a property for research and interpretive purposes and for conservation of information in cases of threatened property destruction. Documentation must have defined objectives so that proposed work may be assessed to determine whether the resulting documentation will meet needs identified in the planning process. The research design or statement of objectives is a formal statement of how the needs identified in the plan are to be addressed in a specific documentation project. This is the framework that guides the selection of methods and evaluation of results, and specifies the relationship of the historical documentation efforts to other proposed treatment activities.

**STANDARDS II.****Historical Documentation Employs An Appropriate Methodology to Obtain the Information Required by the Research Design**

Methods and techniques of historical research should be chosen to obtain needed information in the most efficient way. Techniques should be carefully selected and the sources should be recorded so that other researchers can verify or locate information discovered during the research.

**STANDARD III.****The Results of Historical Documentation Are Assessed Against the Research Design and Integrated Into the Planning Process**

Documentation is one product of research: information gathered about the usefulness of the research design itself is another. The research results are assessed against the research design to determine how well they meet the objectives of the research. The results are integrated into the body of current knowledge and reviewed for their implications for the planning process. The research design is reviewed to determine how future research designs might be modified based on the activity conducted.

**STANDARD IV.****The Results of Historical Documentation Are Reported and Made Available to the Public**

Research results must be accessible to prospective users. Results should be communicated to the professional community and the public in reports summarizing the documentation activity and identifying the repository of additional detailed information. The goal of disseminating information must be balanced, however, with the need to protect sensitive information whose disclosure might result in damage to properties.

**RECOMMENDED SOURCES OF TECHNICAL INFORMATION**

Researching Heritage Buildings. Margaret Carter. Environment Canada, Parks Service, Ottawa, Canada, 1983.

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**SECRETARY OF THE INTERIOR'S  
STANDARDS FOR ARCHITECTURAL AND  
ENGINEERING DOCUMENTATION****STANDARD I.****Documentation Shall Adequately Explicate and Illustrate What is Significant or Valuable About the Historic Building, Site, Structure or Object Being Documented.**

The historic significance of the building, site, structure or object identified in the evaluation process should be conveyed by the drawings, photographs and other materials that comprise documentation. These historical, architectural, engineering or cultural values of the property together with the purpose of the documentation activity determine the level and methods of documentation. Documentation prepared for submission to the Library of Congress must meet the HABS/HAER Guidelines.

**STANDARD II.**

**Documentation Shall be Prepared Accurately From Reliable Sources With Limitations Clearly Stated to Permit Independent Verification of the Information.**

The purpose of documentation is to preserve an accurate record of historic properties that can be used in research and other preservation activities. To serve these purposes, the documentation must include information that permits assessment of its reliability.

**STANDARD III.**

**Documentation Shall be Prepared on Materials That are Readily Reproducible, Durable and in Standard Sizes.**

The size and quality of documentation materials are important factors in the preservation of information for future use. Selection of materials should be based on the length of time expected for storage, the anticipated frequency of use and a size convenient for storage.

**STANDARD IV.**

**Documentation Shall be Clearly and Concisely Produced.**

In order for documentation to be useful for future research, written materials must be legible and understandable, and graphic materials must contain scale information and location references.

## **RECOMMENDED SOURCES OF TECHNICAL INFORMATION**

Recording Historic Buildings. Harley J. McKee. Government Printing Office, 1970, Washington, D.C. Available through the Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402 GPO number 024-005-0235-0.

Photogrammetric Recording of Cultural Resources. Perry E. Borchers. Technical Preservation Services, U.S. Department of the Interior, 1977, Washington, D.C.

Rectified Photography and Photo Drawings for Historic Preservation. J. Henry Chambers. Technical Preservation Services, U.S. Department of the Interior, 1975, Washington, D.C.

## **SECRETARY OF THE INTERIOR'S STANDARDS FOR ARCHAEOLOGICAL DOCUMENTATION**

Archaeological documentation is a series of actions applied to properties of archaeological interest. Documentation of such properties may occur at any or all levels of planning, identification, evaluation or treatment. The nature and level of documentation is dictated by each specific set of circumstances. Archaeological documentation consists of activities such as archival research, observation and recording of above-ground remains, and observation (directly, through excavation, or indirectly, through remote sensing) of below-ground remains. Archaeological documentation is employed for the purpose of gathering information on individual historic properties or groups of properties. It is guided by a framework of objectives and methods derived from the planning process, and makes use of previous planning decisions, such as those on evaluation of significance. Archaeological documentation may be undertaken as an aid to various treatment activities, including research, interpretation, reconstruction, stabilization and data recovery when mitigating archaeological losses resulting from construction. Care should be taken to assure that documentation efforts do not duplicate previous efforts.

**STANDARD I.**

**Archaeological Documentation Activities Follow an Explicit Statement of Objectives and Methods That Responds to Needs Identified in the Planning Process**

Archaeological research and documentation may be undertaken to fulfil a number of needs, such as overviews and background studies for planning, interpretation or data recovery to mitigate adverse effects. The planning needs are articulated in a statement of objectives to be accomplished by the archaeological documentation activities. The statement of objectives guides the selection of methods and techniques of study and provides a comparative framework for evaluating and deciding the relative efficiency of alternatives. Satisfactory docu-



mentation involves the use of archaeological and historical sources, as well as those of other disciplines. The statement of objectives usually takes the form of a formal and explicit research design which has evolved from the interrelation of planning needs, current knowledge, resource value and logistics.

#### **STANDARD II.**

##### **The Methods and Techniques of Archaeological Documentation are Selected To Obtain the Information Required by the Statement of Objectives**

The methods and techniques chosen for archaeological documentation should be the most effective, least destructive, most efficient and economical means of obtaining the needed information. Methods and techniques should be selected so that the results may be verified if necessary. Non-destructive techniques should be used whenever appropriate. The focus on stated objectives should be maintained throughout the process of study and documentation.

#### **STANDARD III.**

##### **The Results of Archaeological Documentation are Assessed Against the Statement of Objectives and Integrated Into the Planning Process**

One product of archaeological documentation is the recovered data; another is the information gathered about the usefulness of the statement of objectives itself. The recovered data are assessed against the objectives to determine how they meet the specified planning needs. Information related to archaeological site types, distribution and density should be integrated in planning at the level of identification and evaluation. Information and data concerning intra-site structures may be needed for developing mitigation strategies and are appropriately integrated at this level of planning. The results of the data analyses are integrated into the body of current knowledge. The utility of the method of approach and the particular techniques which were used in the investigation (i.e. the research design) should be assessed so that the objectives of future documentation efforts may be modified accordingly.

#### **STANDARD IV.**

##### **The Results of Archaeological Documentation are Reported and Made Available to the Public**

Results must be accessible to a broad range of users including appropriate agencies, the professional community and the general public. Results should be communicated in reports that summarize the objectives, methods, techniques and results of the documentation activity, and identify the repository of the materials and information so that additional detailed information can be obtained, if necessary. The public may also benefit from the knowledge obtained from archaeological documentation through pamphlets, brochures, leaflets, displays and exhibits, or by slide, film or multi-media productions. The goal of disseminating information must be balanced, however, with the need to protect sensitive information whose disclosure might result in damage to properties. Curation arrangements sufficient to preserve artifacts, specimens and records generated by the investigation must be provided for to assure the availability of these materials for future use.

#### **RECOMMENDED SOURCES OF TECHNICAL INFORMATION**

Treatment of Archaeological Properties: A Handbook. Advisory Council on Historic Preservation, Washington D.C., 1980.

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#### **SECRETARY OF THE INTERIOR'S STANDARDS FOR HISTORIC PRESERVATION PROJECTS**

##### **General Standards for Historic Preservation Projects**

The following general standards apply to all treatments undertaken on historic properties listed in the National Register.

1. Every reasonable effort shall be made to provide a compatible use for a property that requires minimal alteration of the building, structure, or site and its environment; or to use a property for its originally intended purpose.
2. The distinguishing original qualities or character of a build-



ing, structure, or site and its environment shall not be destroyed. The removal or alteration of any historic material, or distinctive architectural features should be avoided when possible.

3. All buildings, structures, and sites shall be recognized as products of their own time. Alterations which have no historical basis and which seek to create an earlier appearance shall be discouraged.
4. Changes which have taken place in the course of time are evidence of the history and development of a building, structure, or site and its environment. These changes may have acquired significance in their own right, and this significance shall be recognized and respected.
5. Distinctive architectural features or examples of skilled craftsmanship which characterize a building, structure, or site shall be treated with sensitivity.
6. Deteriorated architectural features shall be repaired rather than replaced, wherever possible. In the event replacement is necessary, the new material should match the material being replaced in composition, design, color, texture, and other visual qualities. Repair or replacement of missing architectural features should be based on accurate duplications of features substantiated by historic, physical, or pictorial evidence rather than on conjectural designs or the availability of different architectural elements from other buildings or structures.
7. The surface cleaning of structures shall be undertaken with the gentlest means possible. Sandblasting and other cleaning methods that will damage the historic building materials shall not be undertaken.
8. Every reasonable effort shall be made to protect and preserve archaeological resources affected by or adjacent to, any acquisition, stabilization, preservation, rehabilitation, restoration, or reconstruction project.

### **Specific Standards for Historic Preservation Projects**

The following specific standards for each treatment are to be used in conjunction with the eight general standards and, in each case, begin with number 9. For example, in evaluating acquisition projects, include the eight general standards plus the four specific standards listed under standards for Acquisition. The specific standards differ from those published for use in Historic Preservation Fund grant-in-aid projects (36 CFR Part 68) in that they discuss more fully the treatment of archaeological properties.

### **Standards for Acquisition**

9. Careful consideration shall be given to the type and extent of property rights which are required to assure the preservation of the historic resource. The preservation objectives shall determine the exact property rights to be acquired.
10. Properties shall be acquired in fee simple when absolute ownership is required to insure their preservation.
11. The purchase of less-than-fee simple interests, such as open space or facade easements, shall be undertaken when a limited interest achieves the preservation objective.
12. Every reasonable effort shall be made to acquire sufficient property with the historic resource to protect its historical, archaeological, architectural or cultural significance.

### **Standard for Protection**

9. Before applying protective measures which are generally of a temporary nature and imply future historic preservation work, an analysis of the actual or anticipated threats to the property shall be made.
10. Protection shall safeguard the physical condition or environment of a property or archaeological site from further deterioration or damage caused by weather or other natural, animal, or human intrusions.
11. If any historic material or architectural features are removed, they shall be properly recorded and, if possible, stored for future study or reuse.

### **Standards for Stabilization**

9. Stabilization shall re-establish the structural stability of a property through the reinforcement of load bearing members or by arresting deterioration leading to structural failure. Stabilization shall also re-establish weather resistant conditions for a property.
10. Stabilization shall be accomplished in such a manner that it detracts as little as possible from the property's appearance and significance. When reinforcement is required to re-establish structural stability, such work shall be concealed wherever possible so as not to intrude upon or detract from the aesthetic and historical or archaeological quality of the property, except where concealment would result in the alteration or destruction of historically or archaeologically significant material or spaces. Accurate documentation of stabilization procedures shall be kept and made available for future needs.
11. Stabilization work that will result in ground disturbance shall be preceded by sufficient archaeological investigation to determine whether significant subsurface features or artifacts will be affected. Recovery, curation and documentation of

archaeological features and specimens shall be undertaken in accordance with appropriate professional methods and techniques.

### **Standards for Preservation**

9. Preservation shall maintain the existing form, integrity, and materials of a building, structure, or site. Archaeological sites shall be preserved undisturbed whenever feasible and practical. Substantial reconstruction or restoration of lost features generally are not included in a preservation undertaking.
10. Preservation shall include techniques of arresting or retarding the deterioration of a property through a program of ongoing maintenance.
11. Use of destructive techniques, such as archaeological excavation, shall be limited to providing sufficient information for research, interpretation and management needs.

### **Standards for Rehabilitation**

9. Contemporary design for alterations and additions to existing properties shall not be discouraged when such alterations and additions do not destroy significant historic, architectural, or cultural material and such design is compatible with the size, scale, color, material, and character of the property, neighborhood, or environment.
10. Wherever possible, new additions or alterations to structures shall be done in such a manner that if such additions or alterations were to be removed in the future, the essential form and integrity of the structure would be unimpaired.

### **Standards for Restoration**

9. Every reasonable effort shall be made to use a property for its originally intended purpose or to provide a compatible use that will require minimum alteration to the property and its environment.
10. Reinforcement required for structural stability or the installation of protective or code required mechanical systems shall be concealed wherever possible so as not to intrude or detract from the property's aesthetic and historical qualities, except where concealment would result in the alteration or destruction of historically significant materials or spaces.
11. Restoration work such as the demolition of non-contributing additions that will result in ground or structural disturbance shall be preceded by sufficient archaeological investigation to determine whether significant subsurface or structural features or artifacts will be affected. Recovery curation and documentation of archaeological features and specimens shall be undertaken in accordance with appropriate professional methods and techniques.

### **Standards for Reconstruction**

9. Reconstruction of a part or all of a property shall be undertaken only when such work is essential to reproduce a significant missing feature in a historic district or scene, and when a contemporary design solution is not acceptable. Reconstruction of archaeological sites generally is not appropriate.
10. Reconstruction of all or a part of a historic property shall be appropriate when the reconstruction is essential for understanding and interpreting the value of a historic district, or when no other building, structure, object, or landscape feature with the same associative value has survived and sufficient historical or archaeological documentation exists to insure an accurate reproduction of the original.
11. The reproduction of missing elements accomplished with new materials shall duplicate the composition, design, color, texture, and other visual qualities of the missing element. Reconstruction of missing architectural or archaeological features shall be based upon accurate duplication of original features substantiated by physical or documentary evidence rather than upon conjectural designs or the availability of different architectural features from other buildings.
12. Reconstruction of a building or structure on an original site shall be preceded by a thorough archaeological investigation to locate and identify all subsurface features and artifacts. Recovery, curation and documentation of archaeological features and specimens shall be undertaken in accordance with professional methods and techniques.
13. Reconstruction shall include measures to preserve any remaining original fabric, including foundations, subsurface, and ancillary elements. The reconstruction of missing elements and features shall be done in such a manner that the essential form and integrity of the original surviving features are unimpaired.

## PRESERVATION TERMINOLOGY

**Acquisition** - the act or process of acquiring fee title or interest other than fee title of real property (including acquisition of development rights or remainder interest).

**Comprehensive Historic Preservation Planning** - the organization into a logical sequence of preservation information pertaining to identification, evaluation, registration and treatment of historic properties, and setting priorities for accomplishing preservation activities.

**Historic Context** - a unit created for planning purposes that groups information about historic properties based on a shared theme, specific time period and geographical area.

**Historic Property** - a district, site, building, structure or object significant in American history, architecture, engineering, archaeology or culture at the national, state, or local level.

**Integrity** - the authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric period.

**Intensive Survey** - a systematic, detailed examination of an area designed to gather information about historic properties sufficient to evaluate them against predetermined criteria of significance within specific historic contexts.

**Inventory** - a list of historic properties determined to meet specified criteria of significance.

**National Register Criteria** - the established criteria for evaluating the eligibility of properties for inclusion in the National Register of Historic Places.

**Preservation (treatment)** - the act or process of applying measures to sustain the existing form, integrity and material of a building or structure, and the existing form and vegetative cover of a site. It may include initial stabilization work, where necessary, as well as ongoing maintenance of the historic building materials.

**Property Type** - a grouping of individual properties based on a set of shared physical or associative characteristics.

**Protection (treatment)** - the act or process of applying measures designed to affect the physical condition of a property by defending or guarding it from deterioration, loss or attack, or to cover or shield the property from danger or injury. In the case of buildings and structures, such treatment is generally of a temporary nature and anticipates future historic preservation treatment; in the case of archaeological sites, the protective measure may be temporary or permanent.

**Reconnaissance Survey** - an examination of all or part of an area accomplished in sufficient detail to make generalizations about the types and distributions of historic properties

that may be present.

**Reconstruction (treatment)** - the act or process of reproducing by new construction the exact form and detail of a vanished building, structure, or object, or any part thereof, as it appeared at a specific period of time.

**Rehabilitation (treatment)** - the act or process of returning a property to a state of utility through repair or alteration which makes possible an efficient contemporary use while preserving those portions or features of the property which are significant to its historical, architectural and cultural values.

**Research design** - a statement of proposed identification, documentation, investigation, or other treatment of a historic property that identifies the project's goals, methods and techniques, expected results, and the relationship of the expected results to other proposed activities or treatments.

**Restoration** - the act or process of accurately recovering the form and details of a property and its setting as it appeared at a particular period of time by means of the removal of later work or by the replacement of missing earlier work.

**Sample Survey** - survey of a representative sample of lands within a given area in order to generate or test predictions about the types and distributions of historic properties in the entire area.

**Stabilization (treatment)** - the act or process of applying measures designed to re-establish a weather resistant enclosure and the structural stability of an unsafe or deteriorated property while maintaining the essential form as it exists at present.

Dated: September 26, 1983

Russell E. Dickenson, Director  
National Parks Service

PARKS CANADA

## **PARKS CANADA POLICY**

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## PREFACE

As Canadians, we have a justifiable pride in the beauty of our natural landscapes and in the history of our nation. Parks Canada is the federal agency whose clear mandate is to protect outstanding natural areas and historic places of Canadian significance across the country. As such, Parks Canada's activities play a vital role in the preservation of our national heritage for present and future generations.

Federal initiatives have evolved considerably since the establishment of our first national park in Banff in 1885. Our activities now encompass a system of national parks in every province and territory, national historic parks and sites representing a broad range of historic themes, heritage canals in eastern Canada, and joint Agreements for Recreation and Conservation with several provinces. In addition, new initiatives to protect other aspects of our natural and cultural heritage such as Canadian landmarks, Canadian heritage rivers and heritage buildings are being elaborated in consultation with the provinces and territories.

Taken together, these activities comprise the Parks Canada Program.

This statement of the Government of Canada's policies guides the future direction of the Parks Canada program. Public efforts in developing and refining this policy reflect a deep-seated concern for the protection of Canada's heritage and a widespread public appreciation of its value to all Canadians.

National parks, national historic parks and the other elements of the Parks Canada system provide significant opportunities for us to learn about our heritage, to enjoy outdoor activities and to develop our tourism industry for which these special places are a focus. Equally important, they are an act of faith in the future of Canada: by preserving wilderness tracts and historic resources we are asserting our collective belief that there are special places whose importance transcends their immediate contribution to our gross national product. This is a responsibility not only to future generations of Canadians but also to all mankind as part of international heritage efforts.

## INTRODUCTION

### EVOLUTION OF POLICY

The Parks Canada program is based on the conviction that places of natural and cultural significance constitute a national inheritance which should be protected.

In 1885 the federal government set aside a 10 square-mile area of the Rocky Mountains, including the Banff hot springs. This was the beginning of Canada's system of national parks. Even in these early years federal policy affirmed that these outstanding scenic resources should be publicly owned. The Rocky Mountains Parks Act of 1887 stated that the area was reserved as "a public park and pleasure ground for the benefit, advantage and enjoyment of the people of Canada."

In 1917, Fort Anne became the first National Historic Park when it was transferred from the jurisdiction of the Department of the Militia to the Dominion Parks Branch. In 1919, the federal government set up the Historic Sites and Monuments Board of Canada to advise the Minister concerning the national historic significance of persons, places or events. Since then the federal government has administered historic and natural parks as a single program emphasizing the common themes of national inheritance and public ownership.

In 1930 Parliament approved the National Parks Act. The Act provided legislative protection for national park lands and clarified that these places were to be used by the public so as to leave them unimpaired.

Section 4 of the 1930 Act stated:

"The Parks are hereby dedicated to the people of Canada for their benefit, education and enjoyment, subject to the provisions of this Act and the Regulations, and such Parks shall be maintained and made use of so as to leave them unimpaired for the enjoyment of future generations."

In 1953 the Historic Sites and Monuments Act was passed. This Act formally established the Historic Sites and Monuments Board as an advisory body to the Minister and gave the Minister statutory responsibility for developing and implementing a national program commemorating persons, places and events of prime national historic and prehistoric interest.

In the 1960s Canadians became more aware of their natural environment and developed a renewed interest in their history. The number of visitors to national and historic parks increased sharply leading to a growing concern about park protection and appropriate use. As a result, policies were prepared and issued for national parks in 1964 and national historic sites in 1967.

These policies reflected changing times; greater emphasis was placed on protection of natural and historic resources, interpretation and educational activities, and professional planning.

### NEED FOR A NEW POLICY

Since the 1964 and 1967 policies were published there has been a rapid expansion of the traditional activities of national parks and national historic parks and sites. The amount of land within the national parks system has more than doubled to include areas in every province and both territories. The number, scope and complexity of national historic parks and sites have also increased.

Increases in the numbers of parks and sites are not the only changes. The responsibility for certain historic canals was transferred from the Ministry of Transport to the National and Historic Parks Branch in recognition of the fact that their use as commercial routes to their status as historic and recreational resources. Also, a series of new initiatives was proposed in the 1972 publication "Byways and Special Places" — national landmarks, heritage rivers, national marine parks, historic land trails, historic waterways and scenic and historic parkways.

Other new activities arose from a new perception of the importance of our cultural as well as our natural heritage: the launching of Heritage Canada, the Canadian Inventory of Historic Building, and, most recently, the proposed Canadian Register of Heritage Property. These initiatives represent a desire to find new and flexible ways of identifying, protecting and presenting heritage resources.

Many Canadians now regard places of natural or historic significance not just as isolated monuments or scenic places to be preserved but as a means of learning about, and understanding the evolution of natural and historic environments. One of the most important challenges facing Parks Canada is to accommodate these new directions in its policies.

Parks Canada's policies must also be seen in the light of changing capabilities and priorities of federal, provincial and territorial governments. The federal role requires clarification particularly as it relates to provincial and territorial responsibilities for outdoor recreation and heritage conservation, so that complementary and co-operative programs can be developed among all government agencies.

Recent international developments also have implications for Parks Canada's policies. Canadians are beginning to appreciate that protecting heritage resources is part of their international responsibility.

### THE PURPOSES AND STRUCTURE OF THE NEW POLICY

The main purpose of the new Parks Canada policy is to provide an integrated and comprehensive statement of broad principles to serve as a guide for future initiatives and for more detailed policy statements on specific areas. As such, the policy contains both revised versions of existing, now separate policies, as well as a number of new policies, set within the context of an overall program objective. A further purpose of producing a program policy for Parks Canada is to provide other agencies and the public with a consolidated statement of overall objectives for the program as a whole and for individual activities within it.

This document is divided into three parts: program policies, policies for Parks Canada's current activities and policies for new initiatives. The first part is an overall policy for the Parks Canada program — the objective and broad common principles underlying existing and future Parks Canada activities.

In the second part, a policy has been developed for each of the current activities in the Parks Canada program. Each activity is regarded as an independent means of achieving the overall program objective. Thus, policies for the traditional activities of national parks and national historic parks and sites have been revised to meet current and foreseen needs and to illustrate their contribution to the overall Parks Canada objective. In addition, separate policy statements for historic parks and historic sites have been introduced. Policies for heritage canals and agreements for recreation and conservation (ARC) are included in Part II as well. In general the policies in Part II are not new but revised versions confirming recent Parks Canada actions and approaches.

These activity policies offer guidance for planning and managing each park. They also provide the framework for the development of more specific and more detailed policies which will guide the day-to-day efforts of Parks Canada personnel. Thus the broad policies contained in this document will be further elaborated through strategic policies in a number of key areas as required.

The third part includes discussion of the policy directions for three new Parks Canada initiatives: Canadian landmarks, Canadian heritage rivers and heritage buildings. In contrast to the activity policies in Part II, the policies for these new initiatives are evolving and will be finalized following discussions with provincial and territorial governments.

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## **PART I - PARKS CANADA PROGRAM POLICY**

### **PROGRAM OBJECTIVE**

To protect for all time those places which are significant examples of Canada's natural and cultural heritage and also to encourage public understanding, appreciation and enjoyment of this heritage in ways which leave it unimpaired for future generations.

The word "heritage" means an inheritance or a legacy; things of value which have been passed from one generation to the next.

What is the Canadian heritage we all share? We share our natural surroundings — the prairies, the forests, the lakes, the mountains, the coastlines, the tundra with their variety of plants and wildlife. We also share a history — from prehistoric man, Indian and Inuit cultures, early exploration and settlement by Europeans, the founding of the nation up to yesterday's events.

Certain places representative of Canada's natural and cultural heritage are of importance to all Canadians. These special places should be given the highest degree of protection and managed for the benefit of all Canadians within a national system so as to leave them unimpaired for future generations. Parks Canada, through the Parliament of Canada, is charged with this responsibility. Such places provide benchmarks to assist Canadians to know and appreciate their country and its cultures; to

reinforce national unity through an appreciation of the diversity of Canada and its people; and, to enjoy opportunities for education, recreation and inspiration.

### **PROGRAM POLICIES**

#### **1.0**

#### **Protecting Heritage Resources**

##### **1.1**

##### **Protecting Natural and Cultural Resources**

Parks Canada will make protection of heritage resources its primary consideration.

Ecological and historical integrity are Parks Canada's first considerations and must be regarded as prerequisites to use. Protection of heritage resources is fundamental to their use and enjoyment by present and future generations.

The various factors which contribute to deterioration of heritage resources will be analysed by means of thorough research and protection will be offered in ways appropriate for the type, significance and sensitivity of the resources. Parks Canada recognizes a responsibility to encourage public understanding and enjoyment of heritage resources. The means of doing so in a particular situation will depend upon the constraints which are necessary to ensure the perpetuation and protection of such resources.

##### **1.2**

##### **Impact Assessment and Review**

Parks Canada will take into account, in its planning and management, the full range of implications of any proposed actions on public lands under its administration, management and control.

The consequences of any proposed project, program or activity under Parks Canada's management and control or on lands under its jurisdiction must be considered as early as possible in planning, and this assessment incorporated in the decision to proceed with, reject or modify the proposed action. Consideration should be given to the full range of possible adverse impacts: biophysical, socio-economic, cultural, archaeological, historical and aesthetic. All actions with environmental implications are subjected to identification, measurement and evaluation procedures to the degree dictated by the magnitude of the potential for adverse effects. In this way, Parks Canada adheres to the Federal Environmental Assessment and Review Process established by Cabinet in 1973.



### 1.3

#### **Identifying Heritage Resources**

Parks Canada will identify, in consultation with provincial and territorial governments, heritage resources that are of national significance for possible inclusion in the Parks Canada system.

Parks Canada will undertake studies and inventories of Canada's heritage resources. Using criteria outlined in each activity policy, heritage resources of national significance will be identified and specific examples will be selected for possible establishment as elements in the Parks Canada system. Consultation with provincial and territorial governments is essential in park identification and selection.

### 1.4

#### **Man/Land Relationships**

Parks Canada will protect and present heritage resources in the Parks Canada system in ways which reflect the interrelationships between man and nature.

A distinction is sometimes made between places which are of cultural heritage significance, and places of natural heritage significance. But man and his environment cannot be separated. Parks Canada's efforts to preserve and present natural areas should not ignore the ways in which man has lived within a particular environment and efforts to protect and present historic places should recognize that physiography and climate have been significant factors in Canada's development and history.

### 1.5

#### **Research**

Parks Canada will conduct and encourage research for the identification, protection, understanding and use of Canada's heritage resources.

Research is essential for an understanding of heritage resources so that they can be identified, selected, protected, enjoyed and presented in a responsible and effective manner. Identification and selection of heritage resources of Canadian significance requires intensive studies and inventories of natural regions and historic themes. Protection of heritage resources requires continuing research into the impact of use and techniques of conservation and resource management. Meeting public needs often requires surveys and analyses to identify these needs and to determine how best to respond to them. Accurate interpretation programs must be based on competent research. In satisfying research requirements, Parks Canada will draw upon the ex-

pertise of researchers in federal, provincial and territorial government agencies, in universities and in the private sector, as well as upon the knowledge and experience of individual citizens.

In addition to undertaking essential research for park management purposes, Parks Canada will encourage basic research which may expand man's knowledge of his world and which requires study of natural or cultural resources protected in the Parks Canada system.

The time, place and nature of research activities will be regulated to ensure the protection of heritage resources and the safety and enjoyment of the public. Research information will be made available to the public.

### 2.0

#### **Public Understanding, Appreciation and Enjoyment**

### 2.1

#### **Information and Interpretation**

Parks Canada will undertake a variety of information and interpretation programs to encourage public understanding and appropriate use of heritage resources.

There are three elements in Parks Canada's information and interpretation activities. Parks Canada will inform the general public of its programs, activities, policies, plans and management practices. It will also undertake interpretation programs within parks and through extension programs to illustrate the meaning and value of heritage resources. Thirdly, Parks Canada will provide information to make visitors aware of opportunities for the enjoyment of heritage resources.

### 2.2

#### **Public Participation**

Parks Canada will provide opportunities for public participation at national, regional and local levels, in the development of policies and plans.

Parks Canada is committed to the principle of public participation and will encourage it to the fullest extent possible. The ultimate responsibility for policies and plans and their implementation rests with the Minister responsible for Parks Canada.

Public participation presents numerous advantages. It allows people interested in heritage issues to meet and exchange information and points of view. Citizens' ideas and comments

can provide valuable input to the policy making and planning process. Public input becomes an integral part of this process and results in better decisions. Through such participation, there can be a better understanding of the objectives of Parks Canada and increased public support essential for heritage protection.

Parks Canada protects places which are the heritage of all Canadians. All interested Canadians, therefore, will be invited to state their views on such major issues as national policies, new park establishment, park management plans and large new development proposals. In addition, opportunities for public participation will be provided to those at the local and regional level who have special concerns because they are more directly affected by Parks Canada's activities and operations.

There is no single public participation mechanism suitable to every situation. Therefore opportunities for public participation will be provided in a variety of ways: public information meetings, workshops, questionnaires, interviews, public hearings, seminars, publications, or advisory committees. The approach followed will vary according to the nature and scope of the issues being discussed. For certain matters such as the preparation of management plans, a consistent general approach will be followed for national parks across the country, as outlined in the National Parks Policy. In addition, Parks Canada staff are available to discuss comments and suggestions from organizations and individuals.

For public participation to be effective, certain principles are fundamental:

- public discussion prior to final decisions;
- clear and accurate information;
- indication of areas requiring decisions and relevant policies, legislation and agreements;
- adequate notice and time for public review;
- careful consideration of public input;
- information on the nature of comments received and on Parks Canada's response to participants.

Besides participating in the development of policies and plans, there are other ways in which the public can become involved in the Parks Canada program. For example, there is an increasing desire on the part of individuals and local non-profit organizations to volunteer their services to assist in interpretation or other park operations. Various co-operative arrangements may be possible with organizations and individuals on matters such as research and public information. Policies have been developed to encourage and facilitate volunteer efforts and co-operative activities.

## 2.3

### Outdoor Recreation

Parks Canada will provide opportunities for outdoor recreation within the Parks Canada system as means for present and future generations to understand and enjoy heritage resources in ways consistent with protection of these resources.

Parks Canada's primary concern is to protect and present heritage resources of national significance. Thus public demand for outdoor recreation opportunities in a particular locality is not justification for Parks Canada's participation. Provincial and territorial governments and their agencies, however, have a specific mandate for recreation. Private organizations and individuals also play a role in meeting these demands.

Certain outdoor recreation activities offer a valuable means for enjoying and understanding heritage resources. Parks Canada will encourage those outdoor recreation uses which are directly associated with, and dependent on, heritage resources subject to requirements for resource protection, visitor safety and protection of the rights of other visitors. Within these constraints a variety of activities will be offered in different seasons.

Parks Canada can fulfil only some of the recreation needs of Canadians. Other needs can be met in places which do not have national heritage significance. Provincial, territorial, municipal and private agencies will be encouraged to develop complementary recreation activities and facilities.

## 2.4

### Facilities and Services

Parks Canada will ensure that those facilities and services which are essential and appropriate for public access, understanding and enjoyment are provided and maintained to an appropriate standard.

Certain facilities and services are essential for public access, understanding and enjoyment of elements in the Parks Canada system. The type, location, scale, design and means by which such facilities and services are provided will reflect the particular circumstances. For example, consideration will be given to materials, energy conservation and architectural motif. Facilities and services may be provided by Parks Canada or by contract with private enterprise. The level of service and the quality of facilities will be maintained to standards set by Parks Canada.



## 2.5

### Finance

Parks Canada will finance its activities from that portion of federal tax revenues allocated to it by the Parliament of Canada, may charge fees for specific services, and under certain circumstances may receive gifts or donations in order to meet its objective.

Since 1885, the federal government has accepted that protection and presentation of the Canadian heritage is a worthwhile investment for present and future generations of Canadians. Therefore, Parks Canada is financed by federal tax revenues allocated to it by the Parliament of Canada.

Fees may be charged for services such as the use of certain facilities, motor vehicle access, publications, concession privileges and land uses. Such fees will reflect the need for the federal treasury to recover a portion of the costs of operation and maintenance but will not be so high as to discourage public enjoyment of heritage resources.

Canadians and others may wish to contribute to the protection of their heritage by donating monies, lands or objects to Parks Canada. Such gifts or donations will be accepted providing their use furthers the work of the program for the benefit of all Canadians.

## 3.0

### Roles and Relationships

## 3.1

### Federal Context

Parks Canada will take the lead role in federal government activities related to protecting and presenting places representative of Canada's natural and cultural heritage and will carry out its mandate in close co-operation with related federal agencies.

Parks Canada is the federal agency concerned with places of national heritage significance. Many of its activities are closely related to those of other federal agencies. Some have the primary federal responsibility for various aspects of Canada's heritage such as museum objects, archaeology, the arts, archival material or endangered species. In addition others have objectives which relate indirectly to the mandate of Parks Canada, such as tourism, regional economic development, public works, broadcasting, film, fitness and amateur sport. All of the agencies involved in these activities share with Parks Canada a

common concern with the achievement of Canada's heritage objectives, and this common concern will be expressed through close co-operation and consultations between them and Parks Canada. Their interests and responsibilities will be considered by interdepartmental committees and consultation on specific matters of mutual concern. Some activities are currently co-ordinated through committees such as the Federal Advisory and Co-ordinating Committee on Heritage Conservation (FACCHC) and the Interdepartmental Committee on Tourism. Parks Canada can provide advice and assistance on matters calling for its special expertise, and can encourage others to consider heritage protection in the implementation of their ongoing programs. In some cases, Parks Canada will rely upon the expertise of other federal agencies in carrying out its programs.

## 3.2

### Federal-Provincial Relations

Parks Canada will fulfil its mandate in ways that recognize provincial and territorial responsibilities and complement their efforts in related fields.

Parks Canada is responsible for the protection and the presentation of places representative of Canada's natural and cultural heritage. Provinces have responsibilities in many related areas such as natural resources, education, culture, provincial parks and recreation.

Parks Canada will continue to actively seek provincial and territorial agreement and support for its national program in the interest of all Canadians. For example, Parks Canada will enter into agreements for recreation and conservation (ARC) with provinces to enable joint action in certain heritage areas. New initiatives proposed in this policy, such as Canadian landmarks and Canadian heritage rivers, are based on a flexible approach whereby provincially and federally protected areas together comprise a Canadian system. Federal-provincial agreements are required prior to the establishment of new national parks because the administration and control of most Crown lands is vested in the provinces.

To avoid duplication and to ensure that limited funds and staff are applied where they are most needed, close co-ordination of federal, provincial and territorial programs is necessary. Various mechanisms are available such as Parks Canada's five regional offices, annual federal/provincial conferences and increasingly, senior consultative committees between Parks Canada and individual provinces. Parks Canada can also serve as a contact point for provincial governments to help resolve

specific issues arising where various other federal programs have an impact on provincial parks and heritage conservation activities.

### 3.3

#### **Regional Integration**

Parks Canada will seek to integrate elements of the Parks Canada system with surrounding regions so as to have a positive social, economic and physical impact.

Parks Canada is aware of the potential impact of its actions, both positive and negative, on adjacent areas. Economic development and local employment result directly and indirectly from park establishment and operation. Inevitably there are social consequences, particularly when traditional land uses and employment are affected or when large numbers of visitors are attracted to a particular location. There may be physical impacts as a result of facilities provided for visitors or actions required to protect heritage resources.

Concern for the impact of its actions does not imply that Parks Canada is primarily a program of regional, social or economic development. By acting in a manner sensitive to local concerns and in close collaboration with other government agencies Parks Canada will strive to fulfil its mandate in ways which will be beneficial to, and ensure the best possible integration with, surrounding regions. Local communities and citizens cannot be asked to bear a disproportionate share of the costs of protecting and presenting the national heritage of all Canadians. Therefore, Parks Canada will co-operate with provincial and territorial agencies and, through them, with municipalities responsible for planning surrounding areas so as to resolve

social, economic and physical impacts in a fashion compatible with Parks Canada's objectives. In certain cases, financial assistance may be provided for the development of municipal infrastructure necessary to encourage tourism developments outside parks, by means of federal-provincial cost-sharing agreements through other federal agencies.

### 3.4

#### **International Role**

Parks Canada will assume a leading role in fulfilling Canada's international responsibilities for the protection and presentation of places representative of the world's natural and cultural heritage.

Parks Canada's work is part of a worldwide endeavour to protect and present aspects of the heritage shared with all mankind.

Parks Canada participates in a number of international organizations concerned with protection of the natural and cultural heritage including the International Union for the Conservation of Nature and Nature Resources (IUCN), the International Council for Monuments and Sites (ICOMOS), and the International Centre for the Study of Preservation and Restoration of Cultural Property (The Rome Centre).

In 1976 Canada acceded to the World Heritage Convention, a UNESCO convention providing for the protection of the world cultural and natural heritage. Parks Canada has been designated as the primary agency responsible for fulfilling Canada's obligations under this convention.

Under the UNESCO Man and the Biosphere program, protected areas known as Biosphere Reserves are being created in many countries to conserve the diversity and integrity of plant and animal communities within natural ecosystems. Certain sites within selected Canadian national parks may be designated as core areas of Biosphere Reserves.

Canada has much to learn from other nations and, in turn, can offer valuable assistance. Under several bilateral agreements, Parks Canada undertakes exchanges of information and personnel and provides technical assistance to other countries. Also, Parks Canada has varying degrees of responsibility for certain natural and historic parks located along the Canada-U.S. border.

## PART II - POLICIES FOR PARKS CANADA ACTIVITIES

### NATIONAL HISTORIC SITES

#### Background

One of the most effective ways to stimulate popular interest in, and understanding of, Canadian history is to focus attention to those specific locations most directly associated with historic persons, places or events.

Since 1923, the federal government has erected plaques or monuments to commemorate persons, places or events which are of national historic significance. Locations where such commemoration takes place are called national historic sites and there are now over 600 of them. In special cases, cost-sharing agreements may permit the commemoration and the protection of nationally significant historic structures.

Commemoration by a plaque or monument does not directly ensure the protection of historic resources but it does identify and afford formal recognition to the location and significance of certain aspects of Canadian history.

#### Parks Canada Objective for National Historic Sites

To encourage public understanding of Canada's historical heritage by commemorating persons, places and events of national historic significance with plaques, monuments or by other means funded by cost-sharing agreements.

#### 1.0

#### Identifying Persons, Places and Events of National Historic Significance

Only those persons, places and events which are of historic significance on a national level will be commemorated by Parks Canada as national historic sites. The identification of persons, places and events of national historic significance is based on recommendations of the Historic Sites and Monuments Board of Canada which serves as an advisory body to the Minister responsible for Parks Canada. The Board is assisted by Parks Canada's staff through studies of broad historical themes and research on specific persons, places or events. In the case of prehistoric themes, Parks Canada works in close collaboration with archaeologists of the National Museum of Man (currently known as the Canadian Museum of Civilization).

#### 1.1

Parks Canada will identify and undertake studies of the major themes of Canadian history and prehistory within which persons, places and events of national historic significance will be identified.

#### 1.2

Parks Canada will undertake or encourage the compilation of inventories of prehistoric and historic resources related to certain themes of Canadian history to assist in identifying the historic significance of specific persons, places and events.

#### 1.3

Parks Canada will undertake detailed research into historic significance of persons, places and events to assist the Historic Sites and Monuments Board of Canada.

#### 1.4

Written submissions from the public to the Historic Sites and Monuments Board of Canada concerning persons, places and events which might qualify as being of national historic significance are welcomed.

#### 1.5

The Historic Sites and Monuments Board of Canada receives written submissions, studies background research, and advises the Minister responsible for Parks Canada of those persons, places and events which it considers to be of national historic significance.

#### 1.6

Persons, places and events of national historic significance will be identified according to the following general criteria;

- i) persons who have had a significant impact on Canadian history irrespective of the country in which all or part of their achievements occurred; or
- ii) events or movements which have shaped Canadian history or which illustrate effectively the broad cultural, social, political, economic, or military themes of Canadian history; or
- iii) places which shed light on or illustrate effectively the culture of a prehistoric people, or are associated with important archaeological discoveries; or
- iv) structures which embody the distinguishing characteristics of an architectural or engineering type exceptionally valuable for the study of a style or method of con-

struction of its period or which are examples of the work of a master builder, designer, engineer or architect.

## 1.7

The following will not be eligible for consideration as being of national historic significance;

- i) cemeteries and graves, except those of the Fathers of Confederation and those having archaeological significance;
- ii) structures that have been moved from their original location;
- iii) places outside Canada;
- iv) living persons;

## 2.0

### Commemoration at National Historic Sites

## 2.1

### General Policies

## 2.1.1

Persons, places and events identified as being of national historic significance will be commemorated.

## 2.1.2

The Historic Sites and Monuments Board of Canada recommends to the Minister the appropriate form and location for commemoration in accordance with policies 2.2 and 2.3.

## 2.2

### Location for Commemoration

## 2.2.1

Persons of national historic significance will be commemorated at a place within Canada which is closely associated with their contribution to Canadian history.

## 2.2.2

Events of national historic significance will be commemorated where they occurred.

## 2.2.3

The places at which persons, places and events of national historic significance are commemorated need not be owned by the federal government.

## 2.3

### Forms of Commemoration

## 2.3.1

### Plaques

## 2.3.1.1

The standard form of commemoration will be by means of a plaque.

## 2.3.1.2

The appropriate text for the inscription on a commemorative plaque will be recommended to the Minister by the Historic Sites and Monuments Board of Canada.

## 2.3.1.3

The text on all plaques will appear in both official languages and in other language(s) if appropriate.

## 2.3.1.4

The presence of a commemorative plaque at a place not owned by the federal government does not commit Parks Canada to protect or assist in the preservation of the place or any historic resources located thereon.

## 2.3.2

### Monuments

## 2.3.2.1

Monuments may be erected to commemorate persons, places or events of exceptional importance in Canadian history.

## 2.3.2.2

The design of such monuments should convey to the public the theme to be emphasized in connection with the person, place or event.

## 2.3.2.3

Proposals for the design of distinctive monuments will be invited from artists of the particular region of Canada where the monument is to be erected.

## 2.3.3

### Cost-Sharing Agreements

## 2.3.3.1

Parks Canada may provide financial and technical assistance to municipal and provincial governments as well as pri-



vate non-profit organizations, e.g., local historical societies, to acquire and restore structures of national historic significance which deserve more than a commemorative plaque, but which do not warrant acquisition by Parks Canada as a national historic park.

#### 2.3.3.2

Cost-sharing agreements will be considered:

- i) where there are existing historic resources which are not adequately protected; and
- ii) where there is a local organization which is willing to share the costs of acquisition and protection and to undertake continuing operation; and
- iii) where the planned use of the preserved historic structure is appropriate.

### 2.4

#### Co-operation

#### 2.4.1

Parks Canada will co-operate with provincial and territorial governments and other agencies responsible for commemorative historic plaques to avoid unnecessary duplication.

#### 2.4.2

Parks Canada will co-operate with local, provincial and territorial governments and other interested groups, including local historical societies, in making arrangements for formal ceremonies to unveil a plaque or monument.

### 2.5

#### Information

#### 2.5.1

Parks Canada will inform the public of the location and significance of national historic sites.

#### 2.5.2

Research information on national historic sites will be made available to the public.

## NATIONAL HISTORIC PARKS

### Background

Historic resources in Canada are scarce, often unique, non-renewable, tangible relics of man's past. They range from archaeological evidence of man's earliest presence on this continent to recent architecture and technology; from archaeologi-

cal and ethnographic specimens, through documents and antiques to buildings and large tracts of land. All are in some measure creations of the human mind and hands, illustrations from the past which, if preserved, will benefit present and future generations. They are easily destroyed and, once gone, can never be replaced.

Each year, some of Canada's historic resources are destroyed by natural causes such as erosion and age and it is probable that the destruction caused by man himself is even more serious. The demands of an industrial society and a growing population mean that historic resources are increasingly vulnerable.

The protection of historic resources in Canada is a responsibility which is shared by different levels of government and which can be accomplished in a variety of ways. Museums deal primarily with the collection, preservation and display of cultural objects, not with the acquisition and protection of actual sites. Historic parks focus directly on certain places in terms of their relevance to Canadian history, either by concentrating on one period or, sometimes, by illustrating historical evolution. Historic parks attempt to provide a realistic environment where historic resources can be seen in their natural and cultural context. Through the complementary efforts of historic museums and parks at national, provincial and local levels, the important historic resources of Canada can be protected and the many themes of Canadian history can be illustrated.

Provincial and territorial governments have important objectives for their cultural heritage resources. It is essential that Parks Canada be sensitive to provincial and territorial aims and activities in this area. Parks Canada will attempt to co-ordinate its efforts with related programs to avoid duplication and enable efficient use of resources. It will actively seek provincial and territorial support for the establishment of national historic parks.

National historic parks are the means by which outstanding historic resources of importance to all Canadians can be protected by the federal government and made accessible to the public in their original location and in an authentic setting. Three factors distinguish a national historic park:

- national historic significance;
- protection and interpretation at the original place and in an authentic setting; and
- establishment, protection, interpretation and management by the federal government.



Canada's national historic parks system began in 1917 with the establishment of Fort Anne as a national historic park. Since then many other national historic parks have been developed, particularly in the 1960s and 1970s, representing a variety of historical themes in locations across Canada.

Public interest in our history is evident from the large numbers of people who visit Canada's national historic parks each year. Lower Fort Garry, near Winnipeg, the Fortress of Louisbourg in Cape Breton, Dawson City in the Yukon, Fort Langley in British Columbia, les Forges du Saint-Maurice near Trois-Rivières and the Halifax Citadel are well-known examples of national historic parks.

And although national historic parks illustrate some of the themes of Canadian history, there is still much work to be done. For example, the early emphasis on military history is being balanced by attention to social and industrial themes. In fact, the system of national historic parks will never be complete, because each day we are living what will be history tomorrow.

There are many benefits of national historic parks. They serve as tangible and enduring reminders of the human heritage of Canada, and indicators of the achievements and lifestyle of our ancestors. By visiting the parks Canadians can better understand and appreciate their past. Many people gain satisfaction from knowing that future generations will also be able to visit these areas. A growing number of Canadians are discovering that a visit to a national historic park is a pleasant and rewarding way to spend leisure time. The increased visitation, not only by Canadians but by visitors from other countries, may result in increased employment possibilities and tourism industry development in areas adjacent to national historic parks.

### **Parks Canada Objective for National Historic Parks**

To protect for all time historic resources at places associated with persons, places and events of national historic significance in a system of national historic parks, and to encourage public understanding, appreciation and enjoyment of this historical heritage so as to leave it unimpaired for future generations.

#### **1.0**

### **The National Historic Parks System**

Each of Canada's national historic parks illustrates an important part of the history of Canada. A system of national historic parks can underline the associations among different historic places, periods and themes and thereby encourage a deeper understanding of Canada's past.

Parks Canada strives to establish through co-operation with provincial and territorial governments such a system of national historic parks at locations across Canada where historic resources of national significance deserve protection and interpretation. The essential prerequisite for the establishment of a national historic park is the identification of persons, places and events of national historic significance, based on the recommendations of the Historic Sites and Monuments Board of Canada. This board serves as an advisory body to the Minister responsible for Parks Canada.

Most persons, places or events identified as of national historic significance will be commemorated by a plaque or monument at a national historic site. National historic parks, however, will only be established in certain circumstances to ensure that the system of national historic parks is of the highest quality and reflects a balance among historic themes and geographical regions.

#### **1.1**

### **Identifying Persons, Places and Events of National Historic Significance**

Policies for the identification of persons, places and events of national historic significance are the same as in Section 1. under National Historic Sites Policy.

#### **1.2**

### **Selecting Potential National Historic Parks**

#### **1.2.1**

Potential national historic parks will be selected by Parks Canada according to the following criteria:

- i) the place will have been identified as being of national historic significance or as being prominently associated with persons or events of major national historic significance; and
- ii) the place will possess integrity, will include the original site, and, ideally, at least some original materials and workmanship. Intangible elements such as feelings and associations may be important in judging the integrity of an historic place; and
- iii) the place will be related to a theme of Canadian history which does not already have sufficient representation in the system of national historic parks; and
- iv) the place will have excellent potential for illustrating Canadian history; and
- v) the place will include significant authentic historic resources; and

- vi) it will be possible to protect the historic resources, including their authentic environment within the lands available and at an acceptable cost.

### 1.2.2

In selecting potential national historic parks consideration will be given to:

- i) the advice of the Historic Sites and Monuments Board of Canada as to the appropriate form of commemoration of a person, place or event of national historic significance; and
- ii) the degree to which the historic resources are currently protected or threatened; and
- iii) the geographic balance of national historic parks throughout Canada; and
- iv) the activities and capabilities of other public and private agencies responsible for preserving aspects of Canada's historic heritage; and
- v) international criteria for the protection of historic resources.

### 1.2.3

Potential national historic parks will be selected in consultation with the provincial or territorial government.

## 1.3

### Establishing National Historic Parks

#### 1.3.1

Parks Canada will prepare and periodically update a long-range system plan to guide the priorities for establishment and development of national historic parks.

#### 1.3.2

Parks Canada will acquire land, buildings and other historic resources required for the establishment of a new national historic park, by purchase, long-term lease or other agreement.

#### 1.3.3

Parks Canada will consult with the provincial or territorial government prior to the establishment of a new national historic park.

#### 1.3.4

Parks Canada will consult with the interested public concerning the establishment of a new national historic park.

### 1.3.5

Each new national historic park will be formally established under the National Parks Act.

## 2.0

### Protecting Heritage Resources in National Historic Parks

Heritage resources in national historic parks may include historic structures, historic artifacts, the historic environment and, in certain cases, natural resources. In national historic parks, Parks Canada will attempt to create and maintain an authentic historic setting by preserving existing historic resources and, where necessary, by accurately restoring or reconstructing aspects essential to an understanding of the site's history.

Protection and interpretation of historic resources can be accomplished by three types of treatment:

- Preservation: measures designed to maintain the existing form, integrity and material of historic resources.
- Restoration: recovery of the historic form and details of historic resources by removing later additions and replacing the missing original elements as accurately as possible.
- Reconstruction: accurate reproduction of historic structures or objects.

## 2.1

### Protection of Historic Resources

#### 2.1.1

The preservation of historic resources in their existing form will always be given first consideration over restoration or reconstruction.

#### 2.1.2

Parks Canada will assess the impact of its proposed actions on the prehistoric, historic and natural resources in national historic parks.

## 2.2

### Documentation

Comprehensive records will be established and maintained in the form of a complete dossier for all historic resources (places, structures, objects) related to national historic parks.

## 2.3

### Historic Structures

Historic structures are works of man, created to serve some human activity and are usually by nature or design immovable. Examples are buildings, dams, canals, bridges, fortifications, gardens and roads.

#### 2.3.1

##### Preservation

##### 2.3.1.1

An historic structure will be stabilized or maintained in its existing form:

- i) when the structure, upon acquisition already possesses the integrity and authenticity required; or
- ii) when restoration or reconstruction is required or desirable but, for reasons of cost or lack of sufficient data, must be postponed; or
- iii) when the structure has been restored or reconstructed by Parks Canada and requires ongoing maintenance.

##### 2.3.1.2

Modern techniques and devices (such as for fire, temperature and humidity control) may be used when essential to protect historic structures and objects, and to ensure visitor safety but should intrude as little as possible on the historic atmosphere.

#### 2.3.2

##### Restoration

##### 2.3.2.1

Full or partial restoration of historic structures will only be undertaken under the following conditions:

- i) when it is essential for public understanding of the historical associations and appearance of the national historic park; and
- ii) when the existing structure is in good condition and retains most of its original details; and
- iii) when sufficient data exist to permit accurate restoration; and
- iv) when the cost of restoration can be justified in relation to the historic significance and interpretive potential of the structure.

##### 2.3.2.2

Restoration of structures will be undertaken in such a way that the original historical fabric is safeguarded.

##### 2.3.2.3

Restored or replaced material will be accurately recorded but should be indistinguishable from the original in order to maintain a realistic historic environment.

##### 2.3.2.4

Subject to the availability of data, structures will normally be restored to their most significant historic period but earlier or later components of the structure may be preserved if they are of historic or artistic merit and can be of value in interpreting the evolution of the structure.

#### 2.3.3

##### Reconstruction

##### 2.3.3.1

Reconstruction of a vanished historic structure will only be undertaken under the following conditions:

- i) when reconstruction is essential to public understanding of the historical associations and appearance of the national historic park; and
- ii) when no appropriate alternative action can create such public understanding; and
- iii) when there are no significant preservable remains which will be obliterated by reconstruction; and
- iv) when sufficient historical and architectural data exist to permit an authentic reconstruction; and
- v) when the cost of reconstruction can be justified in relation to the historic significance and interpretive potential of the structure.

##### 2.3.3.2

Reconstructed structures will be identified as such.

##### 2.3.3.3

Reconstruction will be on the original sites except where foundations are of historical merit and cannot be incorporated into the reconstruction; in such cases reconstruction if necessary may be adjacent to the original foundations.

## 2.4

### Historic Artifacts

An historic artifact is material modified by man to produce an object of artistic, utilitarian or symbolic significance, attributed to past culture.

**2.4.1****Conservation**

Historic artifacts will be properly recorded, given appropriate conservation treatment and stored, transported, handled and exhibited in ways which ensure their continued survival with minimum deterioration.

**2.4.2****Restoration****2.4.2.1**

An historic object may be fully or partially restored:

- i) when sufficient data exist to permit accurate restoration; and
- ii) when the object is necessary for an interpretive display but cannot be properly understood without restoration; or
- iii) when restoration is necessary for the survival of the object.

**2.4.2.2**

Replacement material will be accurately recorded but should be distinguishable from the original.

**2.4.3****Reproduction****2.4.3.1**

Artifacts may be reproduced:

- i) when sufficient data exist to permit accurate reproduction; and
- ii) when the object is essential for public understanding through interpretation of the park story; and
- iii) when no original exists, or an original that may exist is unobtainable or too delicate or too valuable for the use intended.

**2.4.3.2**

Reproduced artifacts will be identified as such.

**2.5****Historic Environment****2.5.1**

Parks Canada will preserve or restore the environment of a national historic park to its authentic historic form with a minimum of modification to suit modern tastes.

**2.5.2**

When possible the natural environment, including gardens and landscapes, will be restored and maintained to resemble the appropriate historic period, except as outlined in section 2.6.

**2.5.3**

Administrative and visitor facilities and services which are required within a national historic park will be located and designed so as to minimize their intrusion on the historic environment and will, where possible, be housed in historic buildings.

**2.5.4**

Buffer zones should be established adjacent to national historic parks by land purchase, easements, lease or local zoning to prevent intrusions into the historic scene.

**2.5.5**

Efforts will be made to ensure that park operations, visitor use, safety measures, interpretation and other services do not disturb the historic environment.

**2.6****Natural Features****2.6.1**

Natural features within national historic parks will be protected:

- i) when they are of scientific, ecological or aesthetic significance and/or interest to the public; and
- ii) when serious disturbance to the authentic historic environment will not occur.

**2.6.2**

Significant natural features within national historic parks may be managed according to the appropriate policies for national landmarks.

**3.0****Public Understanding, Appreciation and Enjoyment of National Historic Parks**

National historic parks are one means of enabling Canadians to experience important aspects of their history in an original setting. Besides protecting heritage resources, Parks Canada has a responsibility to make visits to national historic parks enjoyable and educational and to foster awareness and appreciation of Canada's history. This can be accomplished by disseminating information about the location and importance of national



historic parks; by interpreting historic resources and their wider significance to both visitors and non-visitors; by providing opportunities for visitor use and by providing essential facilities and services.

### **3.1 Information and Interpretation**

**3.1.1** Accurate information about national historic parks and the opportunities which they provide will be made available to the general public and to park visitors.

**3.1.2** The interpretation program for a national historic park will be based on the historical resources at the park and the themes of Canadian history which they illustrate.

**3.1.3** Physical aspects of the historic environment may be restored or recreated as an interpretation tool (e.g., restoration or reconstruction of structures, use of period furnishings, restoration and maintenance of the appropriate natural landscape) within the policies for the protection of heritage resources outlined in Section 2.

**3.1.4** Living historical interpretation such as guides in period costumes, role playing, authentic craft demonstrations, etc. may be undertaken:

- i) when sufficient information is available to ensure accuracy; and
- ii) when it is appropriate to and enhances the park story; and
- iii) when the cost can be justified in relation to historic significance and interpretive potential.

**3.1.5** National historic parks will be presented, wherever possible, as they actually existed rather than as “typical” examples.

**3.1.6** Modern interpretation techniques may be used to give park visitors historical background, detail and perspective.

**3.1.7** To ensure that interpretive programs and techniques keep up with evolving visitor interests and needs, research on visitor

expectations and reactions will be conducted periodically at the park level.

**3.1.8** Special interpretation programs may be developed to meet the needs of particular audiences such as school groups.

**3.1.9** Where appropriate, aspects of the natural environment may be interpreted in terms of their historical association or their significance as natural features.

### **3.2 Visitor Use of National Historic Parks**

**3.2.1** The primary purpose of visitor use of national historic parks is to encourage an understanding and enjoyment of Canada's history and of historical resources.

**3.2.2** Recreational activities which are inspired by the historical or natural features will be encouraged to the extent that they do not intrude unduly on the historic environment or jeopardize the protection and direct enjoyment of historic resources.

**3.2.3** Access of visitors to particular parts of a national historic park may be limited to protect historic resources or to ensure visitor safety and enjoyment.

**3.2.4** Special events staged in historic parks by outside organizations will be permitted when such events are closely related to the theme of the park, when they do not jeopardize the integrity of the historic or physical environment, and when they do not detract from public enjoyment of the park.

### **3.3 Visitor Services and Facilities**

**3.3.1** Parks Canada will provide directly or by concession those services and facilities which are essential to public enjoyment of a particular national historic park in ways which do not intrude upon the historic environment.



**3.3.2**

Food services may be provided within national historic parks:

- i) when such services are part of the historic environment; or
- ii) when such services are essential because no reasonable alternative exists outside the park, or because a visit to the park normally requires several hours.

**3.3.3**

Campgrounds will only be developed in national historic parks under exceptional circumstances such as:

- i) when there are no campgrounds available in the vicinity; and
- ii) when it is not feasible for other public or private agencies to develop campgrounds in the vicinity; and
- iii) when there is adequate land within the national historic park to permit campground development without jeopardizing the historic or significant natural environment.

**3.3.4**

Permanent visitor accommodation facilities may be developed within certain national historic parks in exceptional circumstances:

- i) where there are suitable restored or reconstructed buildings which are not essential for primary park purposes, such as park interpretation centres, or for visitor or administrative services; and
- ii) where such visitor use is an additional means of enhancing visitor understanding of the historic environment.

**4.0****Research**

Research is the key to accuracy in all work related to national historic parks, from the initial determination of national historic significance to restoration of historic details and information in the park brochure. By undertaking historical research related to national historic parks, Parks Canada can achieve its own objectives and also contribute to Canada's national historiography.

**4.1**

Parks Canada will encourage and conduct that historical, architectural, archaeological and socio-economic research which contributes directly to the identification, protection, development, interpretation, planning and management of historic resources within national historic parks.

**4.2**

Development at national historic parks will not normally take place until adequate research has been completed.

**4.3**

Actions which reduce the potential for future research on historic resources will be avoided whenever possible.

**4.4**

Use of park resources, research files and collections of artifacts by scholars is encouraged where it is compatible with visitor activities but it is not the intention of Parks Canada to establish permanent research centres in national historic parks.

**4.5**

Research information will be made available to the public and where appropriate, research activities on sites will be interpreted to enhance public understanding of historic resources.

**4.6**

Parks Canada will co-operate with and draw upon the research of historians, historical societies and historic resources agencies at the local, provincial, territorial and national levels and upon the knowledge of individual citizens.

**5.0****Management Plans**

The development and management of a national historic park will be based on a carefully conceived management plan which states how important historic resources are to be protected and outlines those opportunities that will be provided for visitors' understanding and enjoyment. This management plan is the means of implementing Parks Canada's policies in national historic parks.

**5.1**

A management plan will be prepared to guide the development and management of each national historic park.

**5.2**

Interim management guidelines will be prepared shortly after the establishment of a national historic park to guide initial management and development and to ensure that future options are not prejudiced.

**5.3**

The management plan will contain a clear definition of the themes of Canadian history to be illustrated and the objectives of the particular national historic park.

#### 5.4

In national historic parks with extensive land areas, it may be necessary, as part of the management plan, to prepare a zoning plan indicating the type of activities which are appropriate in different parts of the park.

#### 5.5

Opportunities will be provided for the public to participate in the planning for national historic parks.

#### 5.6

The management plan and changes thereto must be approved by the Minister responsible for Parks Canada.

#### 5.7

Parks Canada will co-operate with other levels of government, private organizations and individuals responsible for such facilities as transportation and accommodation of visitors to ensure that national historic parks are integrated into the surrounding region so as to have a positive social, economic and physical impact.

### NATIONAL PARKS

#### Background

Canadians live in a land rich in natural beauty. The shores of three oceans, the Great Lakes, mountains, prairies, thousands of lakes and rivers, forest and tundra - these along with their flora and fauna are some of the natural treasures we have inherited.

For centuries this landscape was affected mainly by natural forces. But more recently, with the advent of an agricultural and then an industrial society, human activities have been altering the natural environment at an accelerating pace.

National parks are a means of preserving in a natural state areas which are representative of the major natural environments of Canada. They are special places which protect part of the heritage of all Canadians, now and in the future. They offer a range of opportunities to learn about and enjoy the natural environment. In order to enable the continued protection of these areas, it is necessary to ensure that visitor activities do not result in harmful changes to ecology or to the appearance of the landscape. To this end, zones are identified within each park which reflect the degree of resource protection required and the type and intensity of visitor use that is appropriate. In this way, a

balance can be achieved between visitor use and wilderness preservation within each national park. In some parks in remote and sensitive natural regions, where large areas are required for ecological preservation and where man can experience nature on its own terms, only certain zones may be designated, so as to maintain the entire area in a wilderness state.

Not all national parks are the same. In remote or northern areas, potential national parks may be identified which are the homeland of people who have traditionally depended on the land and its resources for their survival. Their culture reflects this fundamental relationship. In certain cases, lands which have been traditionally used by native people are the subject of unresolved native land claims. If such areas are to be protected within the national parks system, they must be planned and managed in a way which reflects these special circumstances. An appropriate balance must be maintained between the rights of the public to understand and enjoy Canada's natural heritage, the rights of local people to continue certain traditional uses and the requirement to protect the wilderness of the area.

The first national park in Canada was established in 1885 to protect the newly discovered Banff Hot Springs for public use. The national park system now covers 1.3 percent of Canada's land mass, including areas in each province and territory. Although a variety of landscapes is now represented in Canada's national park system, certain elements are missing; for example, arctic and sub-arctic natural regions and prairie grassland. In addition, marine natural regions are not well represented in the national parks system. Although there are complex jurisdictional problems related to their establishment, policies for national marine parks will be developed. Decisive action is required while the opportunities exist if the heritage of the past is to be passed on to the future. The identification and protection of our important natural heritage areas cannot await or accommodate the advance of competing land uses. National parks are an investment in the future. Foresight in preserving such areas will bring many future rewards even if access is difficult today.

On the international level, Canada's national parks are an important component of a world-wide endeavour to protect outstanding natural areas. Within Canada, the national parks are part of a family of parks and wildlife areas administered by different levels of government and designed to serve various public needs. Within this Canadian family of parks, the national parks are distinct because they are natural areas of Canadian significance, because they are protected by federal legislation and because they are financed by and dedicated to all Canadians.

There are many benefits of national parks. Some are intangible such as the knowledge that future generations will be able to appreciate wilderness areas of untouched natural beauty. Others are more tangible, such as the enjoyment of visiting national parks across Canada. There are also benefits which can be measured in terms of jobs created and tourism industry development. Furthermore, national parks are ecological benchmarks for research into natural processes and into the relative effects of man on lands outside national parks. For all these reasons, Canada has a responsibility to protect these special places and to encourage public appreciation now and in the future.

### **Parks Canada Objective for National Parks**

To protect for all time representative natural areas of Canadian significance in a system of national parks, and to encourage public understanding, appreciation and enjoyment of this natural heritage so as to leave it unimpaired for future generations.

## **1.0**

### **The National Park System**

National parks are intended to protect representative examples of the diversity of Canada's landscape and marine areas for the benefit of present and future generations. To this end, Parks Canada has divided Canada into 48 natural regions, of which 39 are terrestrial and 9 are marine. Each of these natural regions should be represented in the system of national parks. In order to achieve this goal, certain natural areas are identified within each natural region, which include the greatest diversity of natural themes (biologic, geologic, physiographic, geographic and oceanographic) and which are therefore representative of the natural region. These areas are referred to as "representative natural areas of Canadian significance." Potential national parks are selected from among the representative natural areas of Canadian significance.

Parks Canada cannot, however, protect all of the areas identified as being representative natural areas of Canadian significance. By working with the provinces and territories to establish and make public a register listing identified areas, Parks Canada hopes to encourage other public agencies and appropriate private organizations to work toward their protection.

Public interest and support as well as the co-operation of provincial and territorial governments is essential for the establishment of new national parks or the adjustment of existing park boundaries. Within the provinces, a federal-provincial agreement is necessary setting out the terms and conditions of transfer of

administration and control of required lands from the province to the federal government. The process of establishment may take several years and includes joint discussions and feasibility studies by the federal and provincial governments; agreement on terms of establishment and park boundaries; public involvement; resolution of land-use conflicts including agreement on traditional land uses which may be permitted and other special measures to reduce the impact of a new national park on local occupants or users; land assembly and amendments to the federal legislation under which national parks are established. When this last step has been taken, Parks Canada can formally plan for the protection of the area and for public enjoyment of the park's natural heritage resources.

The federal-provincial agreement to create a new national park is one of the most significant steps in the process of national park establishment. It is a joint agreement, and as such, commits two levels of government to a common objective: to protect the park area and encourage public understanding and enjoyment of the area both at the time the park is established and in the future. When national parks are created in conjunction with native land claims, for example in the northern wilderness areas, a special agreement will be necessary between Parks Canada and representatives of local native people to set up an agreed joint management regime for the park. Without the support and co-operation of the provinces, territories, native organizations and the general public, the federal government cannot meet its responsibility to protect the natural heritage of all Canadians.

## **1.1**

### **Identifying Representative Natural Areas of Canadian Significance**

#### **1.1.1**

Representative natural areas of Canadian significance will be identified within each land and water natural region of Canada according to the following criteria:

- i) the area must portray the diverse geological, physiographical, oceanographical and biological themes of a natural region; and
- ii) the area must have experienced minimum modification by man or, if significant modification has occurred, must have potential for restoration to a natural state.

#### **1.1.2**

Representative natural areas of Canadian significance will be identified in consultation with provincial and territorial governments, other federal agencies and with the interested public.



**1.1.3**

Representative natural areas of Canadian significance will be identified regardless of their current protected status or jurisdiction.

**1.2****Selecting Potential National Parks****1.2.1**

Potential national parks will be selected from among identified representative natural areas of Canadian significance according to the following criteria:

- i) the area will be within a natural region which does not already have sufficient representation in the system of national parks; and
- ii) the area will be of a size and configuration so as to:
  - a) include a definable ecological unit(s) whose long term protection is feasible; and
  - b) offer opportunities for public understanding and enjoyment; and,
  - c) result in minimum long term disruption of the social and economic life in the surrounding region; and
  - d) exclude existing permanent communities.

**1.2.2**

In selecting potential national parks consideration will be given to:

- i) the existence of possible threats to the natural environment of the area; and
- ii) competing land uses; and
- iii) the geographic balance of national parks throughout Canada; and
- iv) the location and objectives of other protected natural areas; and
- v) international criteria for national parks.

**1.2.3**

Potential national parks will be selected in consultation with provincial and territorial governments, other federal agencies and with the interested public.

**1.2.4**

Adjustments to the boundaries of existing national parks will be determined according to the policies for selecting potential national parks.

**1.3****Establishing New National Parks****1.3.1**

Parks Canada will develop and keep up-to-date a plan for the system of national parks to assist in setting priorities for the establishment of new national parks.

**1.3.2**

Parks Canada in conjunction with the provincial or territorial government, will consult with local communities and the interested public prior to the establishment of a new national park or the adjustment of boundaries of an existing national park.

**1.3.3**

It is the policy of the Department of Indian and Northern Affairs to ensure that an inventory of the non-renewable natural resource potential of areas in the Yukon and Northwest Territories be compiled prior to their formal establishment as new national parks. The fundamental qualities of the area which recommend it for national park status will be taken into account in any land use activities associated with compiling the inventory. Parks Canada will co-operate with other federal agencies responsible for carrying out such inventories.

**1.3.4**

Commercial exploration, extraction or development of natural resources which exists prior to the establishment of a new national park will be terminated before the park is formally established. Certain traditional uses will be permitted to continue as outlined in section 3.2.11.

**1.3.5**

Parks Canada will contribute toward the cost of special provisions to reduce the impact of park establishment on occupants or other users of lands acquired for a national park.

**1.3.6**

A variety of means will be used to ensure the maximum possible opportunities for local residents to find employment and business opportunities related to the management of national parks.

**1.3.7**

The government of Canada will own all land and resources within national parks.

**1.3.8**

Private lands and interests will normally be acquired by negotiated settlement except in cases where a negotiated settlement cannot be reached and when the lands are essential for park purposes. In such situations, expropriation will be used.

**1.3.9**

Co-operative arrangements will be sought with provincial, territorial and federal agencies to ensure compatible use and management of lands adjacent to the national park.

**1.3.10**

National parks will be formally established following amendment to the schedule to the National Parks Act by the Parliament of Canada.

**1.3.11**

National Parks within the provinces will be established according to an agreement between the Government of Canada and the provincial government setting out the terms for transfer of administration and control of required lands to the Crown in right of Canada. Parks Canada will share equally with the province the costs of acquiring private lands and interests.

**1.3.12**

National parks in the northern territories will be established after consultation with the territorial governments.

**1.3.13**

Where new national parks are established in conjunction with the settlement of land claims of native people, an agreement will be negotiated between Parks Canada and representatives of local native communities prior to formal establishment of the national park creating a joint management regime for the planning and management of the national park.

**1.3.14**

Boundaries of national parks would not be finally established in legislation until a settlement of relevant native claims is reached. As an interim measure such areas may be set aside as "national park reserves".

**2.0****National Parks Zoning System**

Zoning is one of the most important tools for the planning, development and management of national parks. The national parks zoning system is a resource-based approach by which land and water areas of a national park are classified according to their need for protection and their capability to accommodate visitors. It provides a guide for the activities of both visitors and managers within a national park. It assists in managing the tension between use and preservation.

The zoning system provides a means to ensure that the majority of national park lands and their living resources are protected in a wilderness state with a minimum of man-made facilities. Zones permitting a concentration of visitor activities and supporting facilities and services will occupy no more than a small proportion of lands in a national park. Moreover, in certain national parks in remote areas no provision will be made for such zones. In national parks where traditional uses are permitted, the park zoning plan will accommodate such activities.

**2.1**

The zoning system will reflect Parks Canada's policies and will facilitate their application in individual national parks.

**2.2**

The national parks zoning system will apply to all land and water areas of national parks, and to other natural areas within the Parks Canada system as appropriate.

**2.3**

A zoning plan will be an integral part of each national park management plan.

**2.4**

The national park zoning system will consist of the following five zones:

**2.4.1****Zone I - Special Preservation**

Specific areas or features which deserve special preservation because they contain or support unique, rare or endangered features or the best examples of natural features. Access and use will be strictly controlled or may be prohibited altogether. No motorized access or man-made facilities will be permitted.

**2.4.2****Zone II - Wilderness**

Extensive areas which are good representations of each of the natural history themes of the park and which will be maintained in a wilderness state. Only certain activities requiring limited primitive visitor facilities appropriate to a wilderness experience will be allowed. Limits will be placed on numbers of users. No motorized access will be permitted. Management actions will ensure that visitors are dispersed.



## 2.4.3

**Zone III - Natural Environment**

Areas that are maintained as natural environments and which can sustain, with a minimum of impairment, a selected range of low-density outdoor activities with a minimum of related facilities. Non-motorized access will be preferred. Access by public transit will be permitted. Controlled access by private vehicles will only be permitted where it has traditionally been allowed in the past.

## 2.4.4

**Zone IV - Outdoor Recreation**

Limited areas that can accommodate a broad range of education, outdoor recreation opportunities and related facilities in ways that respect the natural landscape and that are safe and convenient. Motorized access will be permitted and may be separated from non-motorized access.

## 2.4.5

**Zone V - Park Services**

Towns and visitor centres in certain existing national parks which contain a concentration of visitor services and support facilities as well as park administration functions. Motorized access will be permitted.

## 3.0

**Protecting National Park Resources**

Land management within national parks differs markedly from that of most other lands, where effort is directed toward modifying or controlling nature, producing crops or extracting natural resources. Within national parks, effort is directed towards protecting our natural heritage by maintaining the physical environment in as natural a state as possible. This fact has far-reaching implications for the resource management of national parks in that many concepts or ideas which are relevant or essential to the successful management of other lands have limited relevance to the management of national parks. Therefore, caution should be exercised before any active manipulation of park resources is undertaken with preference given to allowing natural processes to function unless they have been clearly altered or made inoperative by man-induced changes.

The management of national parks should not, however, be in isolation from the regions in which they are located. Few, if any, land uses, either within or outside national parks, can occur without there being both beneficial and detrimental effects on the surrounding lands. Co-operation with other land management agencies is therefore essential.

National parks are special areas which are protected by federal legislation from all forms of extractive resource use such as mining, forestry, agriculture, oil, gas and hydro-electric development and sport hunting. In some new national parks, however, certain traditional resource uses by local residents may be allowed to continue. Such activities must not destroy or seriously impair the natural values for which the park was established. They will be clearly agreed to in each case at the time of formal establishment of the national park. It is also essential that in establishing new national parks Parks Canada honour the treaties of Indian people which in some cases may involve hunting, fishing and trapping rights in national parks.

The natural and cultural resources of a national park must be protected from the effects of man's activities so that they can be left unimpaired for future generations. Actions by Parks Canada to provide for public understanding and enjoyment of national parks must be carefully considered to minimize their environmental impact. The process of environmental assessment and review is intended to ensure that the full-range of possible adverse effects of any action within national parks is identified, measured and evaluated and that measures are taken to reduce foreseen adverse impacts or to proceed with alternative actions.

## 3.1

**Resource Protection**

Natural resources within national parks will be given the highest degree of protection to ensure the perpetuation of a natural environment essentially unaltered by human activity.

## 3.2

**Resource Management**

## 3.2.1

Natural resources within national parks will be protected and managed with minimal interference to natural processes to ensure the perpetuation of naturally evolving land and water environments and their associated species.

## 3.2.2

An integrated natural resource data base will be developed and maintained for each national park.

## 3.2.3

Manipulation of naturally occurring processes such as fire, insects and disease may take place only after monitoring has shown that:

- i) there may be serious adverse effects on neighbouring

lands; or

- ii) public health or safety is threatened; or
- iii) major park facilities are threatened; or
- iv) natural processes have been altered by man and manipulation is required to restore the natural balance; or
- v) a major natural control is absent from the park; or
- vi) the continued existence of a plant or animal species, which is rare or endangered or which is critical to representation of the natural region, is threatened by a natural cause such as insects or disease; or
- vii) the population of an animal species or stage of plant succession which has been prescribed in the objectives for a park, cannot be maintained by natural forces.

### 3.2.4

Where active resource management is necessary, techniques will duplicate natural processes as closely as possible.

### 3.2.5

Resource management in each national park will take into account factors such as park size, objectives, zoning, geographic location and the nature of activities occurring in surrounding areas.

### 3.2.6

Habitat critical to the survival of an animal or plant species or population may be provided by acquisition, agreement with other agencies or habitat manipulation within the park.

### 3.2.7

A species of plant or animal which has been native to, but which is no longer present in the park area, may be reintroduced:

- i) if the effect on other plants and animals is acceptable; and
- ii) if such action is compatible with park objectives; and
- iii) if such action does not pose serious problems for neighbouring land uses.

### 3.2.8

Non-native species of plants and animals will not be introduced into a national park and, where they exist, efforts will be made to remove them.

### 3.2.9

Parks Canada will seek to eliminate or minimize sources of pollution affecting park resources. Where sources of pollution are external to the park, Parks Canada will work in co-operation with other responsible agencies.

### 3.2.10

Commercial exploration, extraction or development of natural resources will not be permitted in a national park.

### 3.2.11

Certain traditional extractive activities will be permitted in the following circumstances:

- i) In new national parks, guarantees will be provided so that certain traditional subsistence resource uses by local people will be permitted to continue in parts of national parks for one or more generations when such uses are an essential part of the local way of life and when no alternatives exist outside the park boundaries. These exceptions will be agreed to at the time of formal establishment of a new national park and will be outlined in the park management plan.
- ii) Selected activities which are of cultural value in portraying to visitors traditional relationships between man and the land in the park area as part of the park experience may be permitted.
- iii) In new national parks, the treaty rights of Indian people and those rights recognized in native land claims settlements will be honoured and extractive activities which are the subject of such rights can only be terminated after agreement has been reached with the people concerned.
- iv) Controlled sport fishing of naturally regenerating populations of native species will be permitted.

All such activities will be subject to the requirement to protect the ecosystems and maintain viable populations of fish and wildlife species.

### 3.2.12

Places of national historic significance within national parks will be protected and managed according to the policies of national historic sites or national historic parks.

### 3.2.13

Significant archaeological resources in national parks will be protected.

### 3.2.14

Other historical and cultural resources within national parks will be protected:

- i) when such resources are of particular significance and/or interest to the public; and
- ii) when public use and access can be controlled so that significant natural values are not impaired.

### 3.3

#### **Environmental Assessment and Review**

##### 3.3.1

All developments, plans and management activities occurring on national park lands, including those proposed by agencies other than Parks Canada, will be subject to an assessment and review process which ensures that the environmental implications are fully considered in decision-making.

##### 3.3.2

The process used for environmental assessment and review within national parks will be consistent with the Federal Environmental Assessment and Review Process (E.A.R.P.).

##### 3.3.3

All products of the environmental assessment and review process including screening reports, initial environmental evaluations and environmental impact statements will be available for public review.

### 4.0

#### **Public Understanding, Appreciation and Enjoyment of National Parks**

Canadians are encouraged to visit national parks and Parks Canada has a responsibility to provide opportunities for the public to enjoy and understand these special places in ways which are compatible with the long term protection of their natural values.

In responding to visitor needs for services, facilities and outdoor recreation activities, Parks Canada must act with care and imagination. All Canadians have a right to appreciate their natural heritage but the means of doing so and the facilities provided will depend on the sensitivity of the environment to human impact. National parks offer rare and outstanding opportunities to experience and learn about the natural environment in a wilderness setting. They cannot, however, provide for every kind of use requested by the public. Because national parks are dedicated to future as well as present generations, impairment by overuse, improper use and inappropriate development must be avoided. As a general guideline, simplicity in facilities and self-reliance on the part of visitors will be encouraged.

Parks Canada also has a responsibility to inform the Canadian public about their national parks and to provide programs which encourage a better understanding of these natural areas of Canadian significance. Co-operative action with the many

agencies, groups and citizens concerned about national parks can supplement Parks Canada's own efforts to increase public awareness of national parks objectives and issues. In these ways, public support and wise use, which are necessary for continuing protection of national parks, may be achieved.

### 4.1

#### **Visitor Use**

##### 4.1.1

Parks Canada will provide for a variety of outdoor recreation opportunities which are a means for park visitors to enjoy and understand the park's natural environment and which are consistent with the protection of park resources.

##### 4.1.2

Parks Canada will provide for those outdoor recreation activities which are dependent upon a park's natural resources and require a minimum of man-made facilities.

##### 4.1.3

Within the above constraints, provision will be made for activities in which visitors of diverse interests, ages and skills can participate throughout the year.

##### 4.1.4

Parks Canada will encourage private sector and non-governmental organizations to provide skill development programs.

##### 4.1.5

Parks Canada will regulate the amount, kind, time and location of outdoor recreation activities using the zoning plan and other management actions to protect park resources or to ensure visitor safety and enjoyment.

##### 4.1.6

No new golf courses and downhill ski areas will be developed in national parks. Where downhill ski areas exist they will be permitted to develop to the capacity of their legislated boundaries.

### 4.2

#### **Information and Interpretation**

##### 4.2.1

Accurate information about national parks will be made available to all Canadians as well as to park visitors so as to encourage and assist them to appreciate and enjoy national parks.

**4.2.2**

Parks Canada will provide information to make visitors aware of the opportunities for understanding, appreciation and enjoyment of a national park, such as programs, facilities and services available, relevant regulations and necessary skills and equipment.

**4.2.3**

Park Canada will present accurate on-site interpretation programs which will promote understanding and appreciation of the park's natural, cultural and historical values and which will develop an awareness of man's relationship to and dependence on the natural environment.

**4.2.4**

Parks Canada will provide information services and programs to educational institutions, public associations and to those providing public services in national parks so as to help promote awareness and wise use of national parks.

**4.2.5**

Parks Canada will develop co-operative arrangements with organizations and individuals to promote public appreciation and enjoyment of national parks and to encourage their protection.

**4.2.6**

Parks Canada will provide opportunities for individuals, private sector and non-governmental organizations to volunteer services in national parks.

**4.3****Visitor Services and Facilities****4.3.1**

Commercial services and facilities such as hotels, stores and service stations and park administration buildings will, wherever feasible, be located in communities adjacent to national parks.

**4.3.2**

Parks Canada will ensure that facilities and services essential for public understanding and enjoyment of national parks are provided within appropriate zones.

**4.3.3**

Essential facilities and services within national parks will normally be grouped together in visitor centres for public convenience, energy conservation and protection of park resources.

**4.3.4**

Parks Canada will encourage involvement of the private sector including non-governmental organizations in the development and operation of certain approved services and facilities for visitors in national parks.

**4.3.5**

All facilities and services in national parks will be maintained to suitable standards.

**4.3.6**

Rates charged to the public for the use of facilities and services provided either by Parks Canada or by private enterprise should be comparable to those outside national parks for similar services.

**4.3.7**

Where crafts are sold to the public Parks Canada will encourage the promotion of products made in Canada, particularly native handicrafts.

**4.3.8**

The scale, site, form and character of buildings within national parks will be as unobtrusive as possible so that park architecture is in harmony with the natural surroundings.

**4.3.9****Park Access and Circulation****4.3.9.1**

Access to and circulation within national parks will be encouraged so as to provide the public with the opportunity of understanding and enjoying the park in conformity with the zoning plan.

**4.3.9.2**

Non-motorized means of transportation will be used in national parks wherever feasible. Where motorized transportation is required, preference will be given to public transportation.

**4.3.9.3**

Air transportation will not be permitted within national parks except in strictly controlled circumstances. Efforts will be made to restrict aircraft to specific flight lines and altitudes.

**4.3.9.4**

New communication, transportation and utility corridors will not be routed through national parks.



#### **4.3.10**

##### **Visitor Accommodation**

#### **4.3.10.1**

Within national parks, preference will be given to basic accommodation facilities such as campgrounds, hostels and shelters which enhance visitors' appreciation and enjoyment of the parks' natural values.

#### **4.3.10.2**

Campgrounds and other forms of basic accommodation in national parks will be developed in ways which provide visitors with the greatest possible opportunity to experience the natural environment and require a minimum of support facilities and services.

#### **4.3.10.3**

In certain parks more substantial accommodation facilities may be provided because alternatives are too distant.

#### **4.3.10.4**

All commercial accommodation facilities within national parks will be available for use by the general public. National park lands will not be available for the development of new private cottages or camps.

#### **4.3.10.5**

Condominium ownership of visitor accommodation will not be permitted. Condominium ownership of accommodation for those who need to reside in existing park towns will be allowed.

#### **4.3.11**

##### **Land Tenure**

#### **4.3.11.1**

Limited tenure may be granted on national park lands in the form of leases, concessions or licenses of occupation for the provision of essential services and facilities for park visitors.

#### **4.3.11.2**

Holders of land tenure agreements for the use of national park lands will pay an economic rent.

#### **4.3.11.3**

Existing leasehold interests in national parks will be acquired if the lands or facilities are needed for public purposes.

#### **4.3.12**

##### **National Park Towns**

Because of their size, permanent population, year-round services and extensive municipal infrastructure, Banff and Jasper are classified as national park towns. They are unique park communities which have the tax base necessary to support local self-government. Other developed areas, offering services to the public, are designated as visitor centres. These are defined as those planned areas in a park developed and managed to provide services and facilities.

#### **4.3.12.1**

Existing towns (Banff and Jasper) will be limited to the boundaries established by legislation.

#### **4.3.12.2**

No new towns will be developed within national parks.

#### **4.3.12.3**

Parks Canada will continue to own all land and administer land-use planning in national park towns.

#### **4.3.12.4**

The formation of local government to administer services and certain facilities will be encouraged.

#### **4.3.13**

##### **Residency**

#### **4.3.13.1**

Permanent residency in national parks will be limited to those who are providing essential services and who cannot reasonably live outside the park. Temporary residency will be permitted where it is necessary for approved traditional uses.

#### **4.3.13.2**

Permanent residents of national parks will live within a visitor centre or a town if such exists.

#### **4.3.13.3**

Parks Canada will levy charges on residents of visitor centres and towns, in cases where local government does not exist, to recover an equitable portion of the costs of developing and maintaining municipal services.



## 5.0

### Research

Research is essential at all stages in the establishment, development and management of the national parks system. Parks Canada strives to learn about the natural environment so that national parks can be identified, protected and accurately interpreted to the public. In addition, research is important to assess public needs and the impact of visitor uses and facilities.

National parks also offer opportunities for basic scientific research. While such research may not be essential for park management it may expand man's fund of knowledge and enable parks to serve as benchmarks for ecological research and for studies of the effects of modern technology on lands outside park boundaries.

### 5.1

Parks Canada will encourage and conduct research into natural phenomena, public needs, visitor use and impacts so as to contribute directly to the identification, selection, establishment, protection, development, interpretation, planning and management of national parks.

### 5.2

Other research in national parks which will enhance understanding of natural processes and/or enjoyment of natural areas will be authorized:

- i) when use of a national park environment is essential; and
- ii) when such research is undertaken or sponsored by a qualified individual or organization.

### 5.3

Research activities and facilities within national parks will be controlled by Parks Canada to protect natural resources.

### 5.4

Temporary research facilities may be located within national parks for the use of Parks Canada and to encourage compatible or complementary research by other agencies.

### 5.5

Parks Canada will co-operate with and draw upon the research of other government agencies, universities and non-governmental organizations and upon the knowledge of individual citizens.

### 5.6

Current research information will be made available to the public. Where appropriate, research activities will be demonstrated and interpreted to enhance public understanding of the natural environment.

## 6.0

### Management Plans

A management plan is a guide, approved by the Minister, by which Parks Canada administers the resources and uses of a particular national park. Each plan is an expression of Parks Canada's policies for a national park within its regional context. As a public document, the plan provides information on the opportunities which are available to understand and enjoy the park and of the degree of protection which is necessary for different zones within the park.

The park management plan contains a statement of management objectives and the means and strategies for achieving them, stated in a broad but comprehensive manner. The level of detail is confined to the definition of the type, character, locale of developments, and the provision of guidelines for more detailed plans concerning resource management, interpretation and visitor use. The management plan is not an end in itself; rather it constitutes a framework within which subsequent management, implementation and detailed planning will take place. Zoning is a vital component of the management plan. Therefore, proposed changes to a zoning plan require public participation and ministerial approval.

Public participation at the national, regional and local levels is an essential part of the management planning process. A consistent general approach will be followed so as to involve the public from the early stages in key decisions including preparation of park objectives, formulation of alternative park concepts, selection of a final park management plan and any proposed major changes to the plan.

The policies in this document will guide Park Canada's actions in the future. There are however, certain developments in national parks which were permitted or even encouraged in the past but which would not be acceptable today. Such developments will not be allowed to expand and similar new ones will not be permitted. Ideally non-conforming developments should be removed, especially when they result in significant impairment. Often this will not be possible for a variety of rea-

sons related to their long tradition of use. The future of particular non-conforming uses within individual national parks will be decided after public consultation on the management plan for the park.

#### 6.1

A management plan will be prepared for each national park as an expression of Parks Canada's policies and as a guide in park management.

#### 6.2

The management plan will contain a statement of the approved park objectives which will reflect Parks Canada's objective for national parks, and the role of the park in the system of national parks and in the area in which it is located.

#### 6.3

Opportunities will be provided for the Canadian public to be regularly involved from the early stages in the development of management plans for national parks including the preparation of park objectives, the formulation of alternative park concepts, the selection of the final park management plan and any proposed major changes to the plan.

#### 6.4

The management plan and changes thereto must be approved by the Minister responsible for Parks Canada.

#### 6.5

Parks Canada will continuously monitor the implementation of park management plans and will periodically undertake formal plan reviews.

#### 6.6

Parks Canada will co-operate with other levels of government, private organizations and individuals responsible for the planning of areas adjacent to national parks and for the provision of facilities and services in adjacent communities to ensure that national parks are integrated in a positive manner with their surrounding regions.

#### 6.7

In certain cases, financial assistance may be provided for the development of municipal infrastructure necessary to encourage tourism development outside national parks, by means of federal-provincial cost-sharing agreements through other federal agencies.

## HERITAGE CANALS

### Background

In the early part of the last century, British North America embarked with great enthusiasm on a period of canal-building. Constructed prior to the development of railroads and highways, these early canals were intended to facilitate the flow of trade along waterways or, in some cases, to provide alternative routes in case of war. At Confederation the canals came under the jurisdiction of the federal government because of their importance in the transportation system of the new nation.

Since that time the role of these canals as commercial trading routes has diminished and, more recently, their use as recreational waterways has increased dramatically. In addition, the canals have taken on new significance as historic examples of early engineering technology in Canada and as scenic corridors.

In 1972, in recognition of these changes, the responsibility for certain canals was transferred from the Ministry of Transport to Parks Canada. The transfer was made on the understanding that future management of these canals would emphasize not only transportation but the protection, enjoyment and interpretation of their natural and cultural heritage values. The following heritage canals are now operated and maintained by Parks Canada: Rideau, Trent-Severn, Murray, Carillon, Ste. Anne, Chambly, St. Ours and St. Peters. These heritage canals are now an important part of the overall Parks Canada Program.

### Parks Canada Objective for Heritage Canals

To encourage public understanding and enjoyment of Canada's natural and cultural heritage by protecting for all time the heritage resources of certain federally operated canals and by operating these canals for recreational use.

#### 1.0

### Encouraging Public Understanding and Enjoyment

Heritage canals can provide a variety of opportunities for the public to enjoy recreational activities on land and water, and to appreciate aspects of Canada's natural and cultural heritage.

#### 1.1

Information and interpretation programs will be developed by Parks Canada to provide canal users, visitors and the general public with an appreciation of the heritage values of each canal.

**1.2**

Parks Canada will ensure the provision of services and facilities which are essential to maintaining navigation routes, public land access, safety, enjoyment and understanding of heritage features.

**1.3**

A variety of compatible recreation activities will be encouraged so that the land and water resources of heritage canals can be used in all seasons wherever possible.

**2.0****Protecting Heritage Resources**

Heritage canals are navigation routes which include a variety of cultural, natural and recreational resources. Canals illustrate the evolution of man/land relationships and serve as a resource for contemporary recreational use.

**2.1**

Navigation along heritage canals will be maintained as an inherent part of their heritage value.

**2.2**

In the operation and maintenance of heritage canals and in the development of facilities and services for visitors, Parks Canada will protect the heritage character and original historic appearance of each canal. Exceptions may be approved under special circumstances for the mechanization of dams for the efficient control of water levels within the watershed.

**2.3**

Parks Canada will protect and interpret heritage resources which illustrate man's use of natural features for transportation, settlement or economic development.

**2.4**

Historic resources which have been identified as being of national historic significance will be protected according to the policies of National Historic Parks, while recognizing the special requirement for the maintenance of navigation.

**2.5**

Significant natural features on federal lands along heritage canal systems will be protected according to the policies of national landmarks.

**2.6**

Parks Canada may limit the level, type and location of

use of heritage canals to protect heritage resources or to ensure visitor safety and enjoyment.

**2.7**

Canals will be maintained and operated in a manner that minimizes adverse effects on water quality and shoreline property.

**3.0****Planning for Protection and Use of Heritage Canals**

Parks Canada is responsible for the federally owned heritage canals and associated lands. The development and management of each heritage canal and its associated lands should be based on a plan which provides for present and future use and ensures that the character of each heritage canal is protected.

Lands bordering canal waterways may be owned by provincial or municipal governments or by private owners. The planning for those areas which are exclusively federal responsibility must be closely co-ordinated with the planning of adjacent lands by other responsible agencies or individuals to ensure integration of canals with their environment.

**3.1**

Parks Canada will prepare plans to guide the development and management of those aspects of the heritage canals which are a federal responsibility.

**3.2**

Opportunities will be provided for the public to participate in the planning for heritage canals.

**3.3**

Parks Canada will co-operate with provincial and municipal governments as well as other groups and individuals responsible for the planning of lands adjacent to heritage canals; this will normally be accomplished through a co-operative agreement between the parties concerned.

**AGREEMENTS FOR RECREATION AND CONSERVATION****Background**

Certain areas of natural and/or cultural heritage significance can best be protected and presented through the joint efforts of Parks Canada, provincial and territorial governments, other federal departments, other public and private organizations



and individuals. Besides conservation and recreational significance, these areas generally have a substantial physical, economical and social impact on the region. The co-operative approach makes it possible to meet the objectives of the various participants through a joint agreement. Such agreements are called "Agreements for Recreation and Conservation" (ARC) and the areas they apply to are referred to as "co-operative heritage areas." This approach is broader in scope and can be more effective than unco-ordinated actions by individual agencies. It offers opportunities for heritage conservation, in circumstances where the less flexible national parks approach is unworkable because, for example, of extensive private ownership or ongoing resource extraction.

Co-operative heritage areas may be of several types. In some cases there may be a variety of distinctive natural and cultural resources concentrated in an area which, taken together, are of Canadian significance. In other cases there may be an example of one particular type of heritage resource which is considered to be of national significance, e.g., historic land and water routes, urban conservation areas or rural cultural landscapes, and whose preservation requires co-operative action. In identifying and selecting potential co-operative heritage areas, provinces and territories of course play a key role so that proposals reflect their priorities and responsibilities.

The first such agreement for recreation and conservation commits Canada and Ontario to joint planning in the corridor surrounding the Rideau and Trent-Severn canals. This agreement, signed in 1975, is known as the Canada-Ontario Rideau-Trent-Severn (CORTS) agreement. In addition, a Canada-Manitoba agreement was signed in 1978 for the joint development of the Red River Corridor north of Winnipeg, including historic, natural and recreational resources. Several other agreements are being discussed between Parks Canada and different provinces. While there are some similarities between these proposals, each one focuses on a particular combination of heritage resources and is designed to achieve the specific objectives of the participants.

### **Parks Canada Objective for Agreements for Recreation and Conservation**

To protect significant natural and cultural resources within certain heritage areas and to encourage public use, understanding and recreational enjoyment of such areas by acting in conjunction with other governments, organizations and individuals through agreements for recreation and conservation.

## **1.0**

### **Selecting Co-operative Heritage Areas**

Co-operative heritage areas will be selected in co-operation with federal, provincial and territorial agencies and interested organizations and individuals. The selection of co-operative heritage areas will thus reflect provincial needs, for example in outdoor recreation, and be responsive to provincial programs and priorities. Parks Canada's assessment of potential co-operative heritage areas will be based on the following criteria:

- i) Heritage Resources: The area will contain natural and/or cultural heritage resources which are of Canadian significance because of their quality and/or quantity; and
- ii) Heritage Protection: The heritage resources will be in such condition and setting that continuing protection will be possible; and
- iii) Need for Co-operation: The area will be such that the development of its heritage potential will require the participation and co-operation of other agencies with Parks Canada through agreement; and
- iv) Agreement: It will be possible to accommodate the objectives and co-ordinate the independent actions of the participating agencies; and
- v) Parks Canada System: The area will complement other elements in the Parks Canada system.

## **2.0**

### **Joint Action**

Agreements for recreation and conservation commit participating agencies to joint action in a process that involves research, planning, negotiation, development and management.

## **2.1**

The agreement will clearly state the objectives and responsibilities of the participants.

## **2.2**

The participants will jointly determine the strategy for the development and management of agreed activities by outlining the means of utilizing and integrating the authorities and resources of all participants.

## **2.3**

Participating agencies will agree to undertake independently certain aspects of the agreed strategy.

## **2.4**

New proposals for the protection and development of co-



operative heritage areas will be evaluated in light of criteria and rationale by which the particular area was selected and the terms of the agreement.

### 2.5

Planning for a co-operative heritage area is a joint process which produces an integrated plan defining co-ordinated action.

### 2.6

Public participation in the planning process for co-operative heritage areas will be encouraged.

### 3.0

#### **Protecting Heritage Resources**

#### 3.1

Natural and/or cultural heritage resources will be given appropriate protection by the participant who is responsible under the joint agreement.

#### 3.2

National parks, national historic parks or canals within a co-operative heritage area will be administered by Parks Canada according to its policies for that particular activity.

#### 3.3

Activities and uses will be controlled to protect heritage resources and to ensure public safety and enjoyment.

### 4.0

#### **Encouraging Public Understanding and Recreational Use**

#### 4.1

Parks Canada's contribution in a co-operative heritage area will emphasize those information and interpretation programs, recreational activities, facilities and services which foster an appreciation and understanding of the heritage resources.

#### 4.2

Depending on the nature of the co-operative heritage area, a wide range of uses and recreational activities will be encouraged to meet the objectives of the participants as stated in the joint agreement.

## **PART III - POLICIES FOR NEW PARKS CANADA INITIATIVES**

### **CANADIAN LANDMARKS**

#### **Background**

Throughout Canada there are many exceptional natural features and phenomena. They are an important part of our national heritage and should be protected for their educational and scientific value. Some natural wonders such as meteor impact craters, dinosaur fossil sites, subterranean caverns, volcanic cinder cones, glacial moraines and coral reefs cover only a small area and are found in isolation from national parks. Canadian landmarks are one means by which many of these significant natural values can be identified, interpreted and protected.

Landmarks differ from national parks in a number of respects. They are sites containing one or more unique, rare or exceptional natural features or phenomena of Canadian significance, rather than areas encompassing representative natural ecosystems. They are generally small in size compared to national parks. While like national parks they have high potential for public interest and appreciation, landmarks have particularly important scientific value. Because they are small and rare or unique in Canada, they can withstand less use than national parks. The nature and level of visitor use is more strictly controlled, with greater emphasis being given to educational activities. Research activities are encouraged provided they are compatible with the need to protect the natural values.

There are a variety of ways in which such exceptional natural sites can be protected. Parks Canada is proposing a flexible system of Canadian landmarks which could include sites owned and protected not only by Parks Canada but also by provincial governments or by others. The system of Canadian landmarks should strive to include all exceptional natural sites of Canadian significance. Such sites will be identified in consultation with provinces and territories for possible inclusion in this system of Canadian landmarks through studies of natural themes which are refinements of the following broad environmental categories: geology, landforms, vegetation, wildlife, climate, rivers and lakes, oceans and marine life. The criteria for selection of Canadian landmarks and the means by which they can be established and protected will be discussed and agreement sought with the provinces. The policies which follow the criteria will govern national landmarks under the jurisdiction of Parks Canada. These policies are intended to provide a basis for the

inclusion of sites under the ownership and administration of other land managing agencies in the system of Canadian landmarks.

### **Parks Canada Objective for the Canadian Landmarks System**

To foster protection for all time of exceptional natural sites of Canadian significance in a co-operative system of Canadian landmarks, and to encourage public understanding and appreciation of this natural heritage so as to leave it unimpaired for future generations.

#### **1.0**

### **Proposed Criteria for Inclusion in the Canadian Landmarks System**

#### **1.1**

Canadian landmarks must be exceptional natural sites of Canadian significance identified according to the following criteria:

- i) the sites must contain a natural feature or phenomenon which is unique or rare in Canada or the world, or the sites must be the best example of a particular natural theme component in Canada; and
- ii) the sites must have experienced minimum modification by man or, if such modification has occurred, the main feature must be unaffected and the sites must have potential for restoration to a natural state.

#### **1.2**

Canadian landmarks will also satisfy the following criteria:

- i) the sites will be of high scientific value and public interest; and
- ii) the sites will be of a size and configuration so as to:
  - a) encompass a natural feature or phenomenon whose long-term protection is feasible; and
  - b) offer opportunities for research, public understanding and appreciation.

#### **1.3**

Consideration will also be given to:

- i) the degree of protection or threats to the natural environment of the site; and
- ii) competing land uses (recognizing, for example, the policy of the Department of Indian and Northern Affairs to ensure that an inventory of the non-renewable natural resource potential of areas in the Yukon and

Northwest Territories be compiled prior to their formal establishment as landmarks); and

- iii) geographic balance of national landmarks throughout Canada; and
- iv) the location and objectives of other protected natural areas; and
- v) appropriate international criteria.

#### **1.4**

In addition to meeting the above criteria before a site will be formally included in the Canadian system, provision will be made for its long-term protection through legislation, regulations, policies and management plans.

#### **Note**

The following detailed policies will apply to national landmarks owned, protected and administered by Parks Canada as part of the system of Canadian landmarks.

#### **2.0**

### **Protecting National Landmark Resources**

Within national landmarks, resource management will be directed primarily at the protection and preservation of a single natural feature or phenomenon. Manipulation may therefore be required when natural conditions threaten to alter or eradicate the protected feature or phenomenon.

#### **2.1**

### **Resource Protection**

Natural resources within national landmarks will be protected under the National Parks Act to ensure the perpetuation of the main landmark feature or phenomenon.

#### **2.2**

### **Resource Management**

#### **2.2.1**

Natural processes will normally be allowed to proceed without interference unless monitoring has shown that:

- i) the main landmark feature or phenomenon is threatened; or
- ii) there may be serious adverse effects on neighbouring lands; or
- iii) public health or safety is threatened.

#### **2.2.2**

Surface or sub-surface extraction of natural resources from within a national landmark will not be permitted.

**2.2.3**

Sub-surface extraction, from outside a national landmark, of natural resources located under the surface of the landmark will be permitted if the landmark will not be impaired as a result.

**3.0****Public Understanding and Appreciation of National Landmarks**

National landmarks will provide the public with unique opportunities to observe, learn about and appreciate Canada's natural heritage. Intensive use and development will not be appropriate at national landmarks because of their small size and unique features. Local communities adjacent to landmarks will be encouraged to provide accommodation and food services.

**3.1****Visitor Use****3.1.1**

Parks Canada will provide for day-use activities which are a means for park visitors to appreciate and understand the unique natural sites and which are consistent with the protection of the landmark feature.

**3.1.2**

Interpretation, research and other educational uses will be encouraged at national landmarks.

**3.1.3**

Parks Canada will provide for those visitor activities which are dependent upon a landmark's natural resources and require a minimum of man-made facilities.

**3.2****Visitor Services and Facilities****3.2.1**

Parks Canada will ensure that those facilities and services essential for public understanding and appreciation of national landmarks are provided.

**3.2.2**

Controlled access will be provided if possible to the main landmark feature. This will, in most cases, be by public transit or walking trails.

**3.2.3**

Facility development at national landmarks will be restricted to that required for visitors' basic needs and for interpretation and study purposes.

**3.3****Information and Interpretation****3.3.1**

Accurate information about national landmarks and the opportunities which they provide will be made available to the general public.

**3.3.2**

Interpretive programs will be provided to encourage an appreciation and understanding of the landmark.

**4.0****Research**

National landmarks are exceptional sites of high scientific value which offer excellent opportunities for research into natural features and processes. Management-oriented research will also be essential in identifying potential national landmarks and planning for their protection and for public appreciation.

**4.1**

Parks Canada will encourage and conduct research necessary to identify unique natural areas of Canadian significance and to select national landmark sites.

**4.2**

Parks Canada will encourage and conduct research at a national landmark which contributes to an understanding of natural features and processes and to planning and managing the national landmark.

**4.3**

Parks Canada will co-operate with and draw upon the research of other government agencies, universities, non-governmental organizations and the knowledge of individual citizens.

**4.4**

Research information will be made available to the public and where appropriate, research activities will be demonstrated and interpreted to enhance public understanding of the natural environment.

## 5.0

### Management Plans

A management plan is a guide by which Parks Canada administers the resources and uses of a particular national landmark. It is an expression of Parks Canada's policies at the site level and, as a public document, it informs the public of the opportunities which are available to understand and appreciate the landmark and of the degree of protection which is necessary.

## 5.1

A management plan will be prepared for each national landmark as an expression of Parks Canada's policies and as a guide in the management of the site.

## 5.2

Opportunities will be provided for the Canadian public to participate in the planning of national landmarks.

## 5.3

The management plan and changes thereto must be approved by the Minister responsible for Parks Canada.

## 5.4

Parks Canada will co-operate with other levels of government, private organizations and individuals responsible for the planning of areas adjacent to national landmarks and for the provision of facilities and services in nearby communities to ensure that national landmarks are integrated in a positive manner into their surrounding regions.

## CANADIAN HERITAGE RIVERS

### Background

In Canada we still have rivers that flow through essentially natural environments, their channels unobstructed and their waters relatively unpolluted. Such rivers are outstanding examples of our natural heritage. As well, some of these rivers provided a source of food and a means of transportation for native people and early settlers, thereby playing a significant role in the exploration, trade and settlement of our country. These rivers are important elements of Canada's natural and cultural heritage, which should be preserved in an unspoiled state for the benefit of present and future generations.

Concerns for preserving Canadian heritage rivers complement international efforts to protect significant elements of the world heritage. Canada, in fact, has heritage rivers in relative

abundance as compared to other nations. Consequently, other nations would naturally look towards Canada to protect in perpetuity, some of the world's best examples.

Parks Canada's Wild Rivers Survey, conducted from 1971 to 1973, gathered information on approximately 16,650 kilometres of rivers. The survey provided an opportunity for analysing and comparing the scenic and recreational resources of major Canadian heritage rivers, and provides an opportunity to formulate goals for the preservation of the best examples of these rivers and their associated lands. The establishment of a Canadian heritage rivers system should be a long-range program which intends to designate nationally significant environments in which rivers, unaltered by man, are the predominant features.

Parks Canada is proposing a system of Canadian heritage rivers which could include areas owned and protected by the federal, provincial or territorial governments. This policy outlines only draft criteria for the selection of heritage rivers to be included in such a Canadian system.

### Parks Canada Objective for Canadian Heritage Rivers

To foster protection of outstanding examples of the major river environments of Canada in a co-operative system of Canadian heritage rivers, and to encourage public understanding and enjoyment of this natural heritage so as to leave it unimpaired for future generations.

Parks Canada's first actions to meet this objective will be to discuss and seek agreement with provinces and territories on the proposed criteria for inclusion in the system of Canadian Heritage Rivers, the process for establishing the system and the means for protecting and managing rivers or designated sectors of rivers of Canadian heritage significance.

### Proposed Criteria for Inclusion in the Canadian Heritage Rivers System

#### 1.

Heritage rivers or designated sectors of rivers will be outstanding representations of the major river environments of Canada, with particular attention given to their role in Canadian history; and

#### 2.

Heritage rivers will satisfy the following physical criteria:

- i) free of impoundments within designated sectors; and



- ii) shorelines essentially natural; and
- iii) the water relatively free of man-made pollutants; and
- iv) inaccessible by road except at occasional crossings; and
- v) river flow sufficient to support low intensity recreation activities; and

3.

Heritage rivers and their associated lands will exist as an environmental unit so as to:

- i) provide visitors with a natural experience by preserving the lands seen from the river surface and the shorelines as much as possible in an unaltered state; and
- ii) adequately portray the scale, character, and themes of the river regime and associated lands; and
- iii) ensure the ecological integrity of the river and associated lands; and

4.

Consideration will also be given to:

- i) the degree of threat to the natural environment; and
- ii) the geographic distribution of Canadian Heritage Rivers; and

5.

In addition to meeting the above criteria, before a river will be formally included in the Canadian system, provision will be made for the long-term protection of heritage rivers through legislation, regulations, policies and management plans.

## HERITAGE BUILDINGS

### Parks Canada's Objective for Heritage Buildings

To act as the co-ordinating federal agency in fostering the protection of Canada's architectural and cultural heritage through: the conservation of heritage buildings under federal jurisdiction; the elimination of disincentives to heritage building conservation; the development of co-operative programs with the provinces and territories to encourage public and private initiatives in this field.

### Background

Heritage buildings are an important aspect of Canada's cultural heritage and the subject of increasing public and private interest. Not only is it important to protect the built environment as examples of Canada's architectural heritage but older buildings often enhance the quality of life in urban centres, they represent wise uses of energy and materials and assist tourism

development. While recognizing the jurisdictional rights, responsibilities and priorities of provincial and municipal governments, Parks Canada can play an important role in co-ordinating federal initiatives in this field.

Firstly, the federal government can take steps to protect historic buildings it owns, to set an example for others. The heritage significance of certain federal buildings should be recognized and their protection and continued use assured.

Secondly, the federal government can review its legislation, policies and regulations with a view to eliminating, where practical, aspects which are disincentives to heritage building conservation. The federal Income Tax Act purportedly encourages demolition of older buildings under the provisions for terminal losses and recapture of depreciation. The National Building Code and Fire Regulations present other obstacles that discourage owners and builders from rehabilitating older structures as the costs involved in meeting specifications and standards can be prohibitive.

Thirdly, the federal government can co-operate with the provinces and territories in developing programs of support and assistance in the rehabilitation of individual heritage buildings and of heritage areas or districts. The Canadian Inventory of Historic Building (CIHB), designed primarily to assist Parks Canada in the identification and evaluation of structures of national historic or architectural significance, serves as a source of basic information for all those who are interested in architectural history or conservation. A Canadian Register of Heritage Property (CRHP) program could be developed in co-operation with the provinces and territories along the lines originally proposed in 1977. This would provide a national register recognizing older buildings of architectural, cultural or historic merit based on nominations by an appropriate provincial or territorial committee.

The federal government is considering several possible ways to stimulate heritage building conservation in the private sector through the elimination of disincentives, the development of a special heritage building rehabilitation program through Central Mortgage and Housing Corporation and the possible introduction of tax incentives for owners of registered heritage buildings.

Taken together these federal actions could provide substantial impetus to heritage building conservation without infringing on provincial jurisdiction and responsibilities, or pri-

vate sector initiatives. A federal policy should recognize the importance of heritage building conservation in all federal activities. Parks Canada will continue to play a lead role in encouraging and co-ordinating practical federal initiatives through the Federal Advisory and Co-ordinating Committee on Heritage Conservation (FACCHC).



# **PART III**

## **CULTURAL RESOURCE MANAGEMENT POLICY**

### **(PROPOSED)**

This section of the policy represents a major innovation with respect to the 1979 Parks Canada Policy, and reflects the status of the Canadian Parks Service, both nationally and internationally, in the field of cultural heritage management. It proposes a holistic approach to resource management that integrates the protection and presentation of cultural resources. The policy will apply to all cultural resources administered by the Canadian Parks Service, and consequently this policy is a necessary complement to the policies on national historic sites, historic canals, national parks, and national marine parks.



## CULTURAL RESOURCE MANAGEMENT POLICY

### Background

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##### 1.2

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##### 2.3

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##### 3.4.4

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## CULTURAL RESOURCE MANAGEMENT POLICY

### BACKGROUND

The Canadian Parks Service is one of the principal cultural resource management agencies in Canada. It is responsible for a vast array of cultural resources in public settings at national parks (includes national marine parks), national historic sites, and historic canals, as well as in collections and at other properties that it administers.

Cultural resource management is an integrated and holistic approach to the management of cultural resources. It applies to all activities that affect cultural resources administered by the Canadian Parks Service, whether those activities pertain primarily to the care of cultural resources or to the promotion of public understanding, enjoyment and appropriate use of them.

For the Canadian Parks Service, a cultural resource is a human work or a place that gives evidence of human activity or has spiritual significance, and that has been determined to be of historic value. Cultural resources are distinguished from other resources by virtue of their assigned historic value. The Canadian Parks Service may apply the term cultural resource to a wide range of resources in its custody, including, but not limited to, cultural landscapes and landscape features, archaeological sites, structures, engineering works and artifacts.

Frequently, cultural resources occur in complexes or assemblages. Such assemblages might include movable and immovable resources, resources that are above ground and below, on land and in water, and whose features are both natural and fabricated.

Because the term cultural resource embraces the whole as well as the parts that make up the whole, cultural resource management operates on two levels. It applies to the overall management of a national historic site or an historic canal (which can be considered as cultural resources), as well as to the individual cultural resources that are contained in a national historic site, national park or historic canal.

The challenges of managing cultural resources for public benefit are considerable. By their very nature, the most significant and precious cultural resources are those whose protection and public presentation are most desirable. In its commitment to resource protection the Canadian Parks Service must deter-

mine how best to promote visitation and public understanding of cultural resources, without diminishing the qualities that give those resources their value. The Canadian Parks Service must respond to the needs and interests of the visitor while safeguarding the fragile and irreplaceable resources being visited. It must encourage appropriate use of cultural resources while not consuming those resources. It must integrate the management of the cultural and the natural realms. Finally, it must determine the most effective means of protection and presentation within available financial and human resources.

Cultural resource management depends on a strong corporate or organizational ethic embodied in a set of principles. In its practice, cultural resource management integrates professional, technical and administrative activities to ensure that cultural resources are identified and evaluated, and that their historic value is duly considered in all actions that might affect them.

Canadian efforts to protect and present cultural resources for public benefit are part of a world-wide endeavour to protect, understand and appreciate our human heritage. In its stewardship of treasures of national historic significance as well as of other valued cultural resources, the Canadian Parks Service acts within a national and international community of agencies who share the responsibility of managing our human heritage for public benefit. In so doing, the Canadian Parks Service both contributes to and benefits from the development of a national and international body of principles and practices of cultural resource management.

To promote awareness of good cultural resource management the Canadian Parks Service encourages the application by others of its principles and practice, in particular by making this policy available to other trustees of cultural heritage, including the owners of properties designated as being of national historic significance.

### OBJECTIVE

To manage for public benefit cultural resources administered by the Canadian Parks Service.

#### 1.0

#### Principles of Cultural Resource Management

In managing cultural resources the Canadian Parks Service will adhere to principles of value, public benefit, understanding, respect, and integrity, and will proceed on a case-by-case basis. These principles are not mutually exclusive; they share common elements and work most effectively when considered as a whole rather than individually.

The principles of this policy apply to all agreements that CPS makes with others respecting the management of cultural resources.

The guidance provided by these principles is made more explicit in directives, manuals, standards and guidelines developed by CPS.

## **1.1 Principles of Value**

### **1.1.1**

In the Canadian Parks Service, resources that have historic value are called cultural resources. It is for this value that cultural resources will be safeguarded and presented for public benefit.

### **1.1.2**

While all cultural resources are valued, some cultural resources are deemed to be of the highest possible value and will be protected and presented accordingly.

- CPS will value most highly those cultural resources of national historic significance.

### **1.1.3**

Cultural resources rarely occur in isolation. They often derive their value from being part of a place or a site.

CPS will value cultural resources in their context and will consider resources as a whole as well as discrete parts.

### **1.1.4**

A cultural resource whose historic value derives from its witness to many periods in history will be respected for that evolution, not just for its existence at a single moment in time.

- CPS will reveal an underlying or previous physical state of an object, structure or site at the expense of later forms and material only with great caution; when historic value is clearly related to an earlier form, and when knowledge and existing material of that earlier form allow.

### **1.1.5**

A cultural resource that derives its historic value from the interaction of nature and human activities will be valued for both its cultural and natural qualities.

### **1.1.6**

Natural resources frequently form an integral part of the history and landscape of national historic sites and historic canals. Natural resources in national historic sites and historic canals will be valued in a manner that reflects the role of CPS as a major environmental steward.

- CPS will conduct a natural resource inventory on lands and waters within national historic sites and historic canals to determine the state of the natural resource base and to identify natural resources of special significance that should be protected.
- Critical wildlife habitat of species that have been designated as rare, threatened or endangered by the Committee on the Status of Endangered Wild-life in Canada (COSEWIC), or by the province or territory in which the area is located, will be protected.
- Natural resources, which by virtue of their strategic location and other physical or biological characteristics are of value to Environment Canada and to other government agencies involved in environmental monitoring and programs to maintain biodiversity and genetic resources in Canada, will be protected.
- Natural resources of special significance will be managed in accordance with the principles and relevant policies regarding the protection and management of natural resources set out in section 3.0 of the National Parks Policy, and by the applicable directives and procedures used to guide the management of natural resources in the national parks.
- Sites and canals with extensive areas may be zoned in order to indicate the types of activities that are appropriate in different parts of the site or canal.

## **1.2**

## **Principles of Public Benefit**

**1.2.1**

Cultural resources are dedicated and held in trust so that present and future generations may enjoy and benefit from them.

Public benefit of cultural resources will be most appropriately achieved by the protection and presentation of that which is of national historic significance.

The continuing public benefit of a resource will be assured through ongoing maintenance and care.

**1.2.2**

To understand and appreciate cultural resources and the sometimes complex themes they represent, the public will be provided with information and services that effectively communicate the importance and value of those resources and their themes.

The Canadian Parks Service will present the history and cultural heritage of its national parks, national historic sites and historic canals in ways that recognize the nature and interests of the public it serves.

**1.2.3**

CPS will encourage appropriate visitor use and public involvement in the presentation of cultural resources at national parks, national historic sites and historic canals.

- Appropriate uses of cultural resources will be those uses and activities that respect the historic value and physical integrity of the resource, and that promote public understanding and appreciation.
- Information about cultural resources will be made available except in cases where a particularly fragile cultural resource (certain archaeological remains, for example) might be threatened.
- In the interest of long-term public benefit, new uses that threaten cultural resources of national historic significance will not be considered, and existing uses which threaten them will be discontinued or modified to remove the threat.

**1.3****Principles of Understanding****1.3.1**

The care and presentation of cultural resources require knowledge and understanding of those resources, the history they represent, and the nature, interests, and expectations of the public for whom the resources are held in trust.

- Cultural resource management activities in the Canadian Parks Service will be based on professional and technical knowledge, skills and expertise.

- CPS will integrate the contributions of relevant disciplines in planning and implementing cultural resource management, and will place a particular importance on interdisciplinary teamwork.
- Adequate research and investigation will precede any action that might affect cultural resources and their presentation.

**1.3.2**

The importance of genuine public understanding, appreciation and enjoyment of cultural resources will be recognized.

- CPS will determine the nature and various interests of the public to develop effective means of communication.

**1.3.3**

Information about cultural resources will be recorded and those records will be maintained for the future.

- CPS will maintain up-to-date inventories and dossiers on its cultural resources. Dossiers will contain basic data and related documentation, including the results of research and evaluation, records of decision and actions taken. Heritage recording will be carried out on cultural resources of national historic significance.
- When faced with loss due to human or natural forces and when long-term stabilization or salvage is not possible, cultural resources will be recorded and documented to preserve a public record.

**1.3.4**

CPS will avoid actions that reduce the potential for future understanding and appreciation of a cultural resource and the legacy that it represents.

**1.4****Principles of Respect****1.4.1**

Those who hold our heritage in trust are responsible for passing on that heritage in ways that maintain its potential for future understanding, appreciation and study. As an irreplaceable part of this heritage, cultural resources will be managed with



continuous care and with respect for their historic character; that is, for the qualities for which they are valued.

- The Canadian Parks Service will respect the distinguishing features that constitute the historic character of a cultural resource.
- Uses of cultural resources will be respectful of, and compatible with, their historic character. This applies equally to the use of landscapes and structures, the display or use of artifacts and to public activities affecting cultural resources.
- Appropriate visitor activities and public uses of cultural resources at national parks, national historic sites and historic canals will respect the resources and be consistent with the purpose, themes and objectives of the park, site or canal.

#### 1.4.2

Trustees are obliged to act in ways that best ensure the continued survival of the resource, with minimum deterioration.

- CPS will respect cultural resources by using the least destructive and most reversible means to accomplish objectives. Variance from the path of least intrusive action must be justified.
- Respectful, preventive and continuing maintenance will form an indispensable part of cultural resource management in CPS.

### 1.5

#### Principles of Integrity

##### 1.5.1

The Canadian Parks Service will present the past in a manner that accurately reflects the range and complexity of the human history commemorated at or represented in a national historic site, historic canal or national park.

- Evidence that is specific to a resource or site will always be preferred to general evidence of a type or period.
- There are times when one may have to rely on evidence that is indirect, but which is consistent with what is highly probable in the light of known facts and patterns. CPS will permit conservation and interpretation based on such evidence only when the activities founded thereon are based on extensive professional and/or technical knowledge, when they

are carefully documented and recorded, and when, with respect to the physical features that constitute the historic character of a cultural resource, they are reversible.

- The use of indirect or comparative evidence will be acknowledged.
- Depictions of the past without basis in knowledge will not be considered.

##### 1.5.2

Cultural resources should be distinguishable from, and not overwhelmed by, efforts to enhance and present them. New work of all kinds will be distinguishable from the work of the past.

- New work will be sensitive to the historic character of the resource or resources of which it forms a part and will not overwhelm those resources.
- Reconstructions and reproductions of past forms should not be confused with what is genuinely the work of the past. Reproductions and reconstructions will be suitably marked so as to distinguish them from the original.

### 2.0

#### The Practice of Cultural Resource Management

The Canadian Parks Service will apply the principles of this policy within a practical framework of cultural resource management. The practice of cultural resource management is not itself a formal process distinct from the activities and processes in place in CPS; rather, it integrates those activities and processes.

The practice of cultural resource management requires that four elements be in place in all decision-making that affects cultural resources:

- i) the inventory of resources;
- ii) the evaluation of resources to determine which are to be considered as cultural resources and what it is that constitutes their historic value;
- iii) the consideration of historic value in actions affecting conservation and presentation; and,
- iv) monitoring and review to ensure that conservation and presentation objectives continue to be met effectively.

The practice of cultural resource management provides a framework for decision-making rather than a set of predetermined answers. Its aim is to ensure that the historic character for which resources are valued is identified, recognized, considered and communicated.

The practice of cultural resource management in CPS recognizes those international conventions and federal policies that encourage the consideration of heritage value in management; for example, the World Heritage Convention, the Environmental Assessment and Review Process, the Policy on Federal Heritage Buildings and the Federal Policy on Land Use.

## 2.1

### **Inventory of Resources**

All resources administered by the Canadian Parks Service will be given initial consideration as cultural resources within the meaning of this policy.

#### 2.1.1

CPS will develop and maintain inventories of all the resources it administers for the purpose of determining which resources should be identified as cultural resources.

#### 2.1.2

All buildings under CPS authority that are 40 years old or older will be identified for the purposes of applying the Policy on Federal Heritage Buildings.

## 2.2

### **Evaluation of Resources to Determine Cultural Resources and their Historic Value**

Evaluation enables the Canadian Parks Service to determine which resources are cultural resources and what it is that constitutes their value; that is to say, what distinctive qualities and features make up the historic character of a cultural resource. An understanding of the historic character of a resource focuses the program's efforts at protection, presentation and appropriate use.

For the purposes of this policy, Ministerial plaques and monuments will be considered as cultural resources and managed as such.

CPS will evaluate resources for their historical associations, their aesthetic and functional qualities and their relationships to social and physical environments, for purposes of determining which of the following three levels should be ascribed to a resource:

#### 2.2.1

##### **Level I:**

National historic significance is the highest level assigned to a cultural resource in the custody of the Canadian Parks Service. National historic significance will be determined in accordance with the Policy on National Historic Sites. It should be noted that there are national historic sites within the boundaries of national parks and that a number of the historic canals are also national historic sites.

##### 2.2.1.1

Evaluation to determine national historic significance is undertaken by the Historic Sites and Monuments Board of Canada. Its recommendation to the Minister of the Environment, and any subsequent Ministerial designation, may specify which resources within a designated national historic site are themselves of national historic significance.

##### 2.2.1.2

Where a Ministerial designation is not specific with respect to the national historic significance of resources at a national historic site, the program will apply the commemorative intent of the designation to determine which resources are to be specifically considered of national historic significance.

#### 2.2.2

##### **Level II:**

A resource that is not of national historic significance may have historic value and thus be considered a cultural resource.

##### 2.2.2.1

The Canadian Parks Service will establish and apply criteria to determine which resources are Level II. A resource may be included in this category by virtue of its historical, aesthetic or environmental qualities. Buildings that are designated "classified" or "recognized" in accordance with the Policy on Federal Heritage Buildings will be considered as Level II cultural resources.

##### 2.2.2.2

Criteria will also give consideration to such factors as regional or local association; or provincial, territorial or municipal designations.

### 2.2.3

#### **Level III:**

While all resources under the administration of the Canadian Parks Service deserve initial consideration as cultural resources, resources that are determined, upon evaluation, not to meet criteria established for Levels I and II are exempted from this policy, and will be managed under other appropriate processes and policies.

#### 2.2.3.1

Resources evaluated and deemed not to be of historic value may be re-evaluated at a later date.

### 2.3

#### **Consideration of historic value in actions affecting cultural resources**

Cultural resource management requires that the concept of historic value of cultural resources be fully integrated into the planning and delivery of conservation, presentation and operational programs.

#### 2.3.1

Planning processes will recognize that resources of national historic significance are of highest value to the Canadian Parks Service, and that resources of historic value are at the second level of importance.

#### 2.3.2

In all actions that affect cultural resources, CPS will consider the potential consequences of proposed actions on the historic character of those resources and will plan and implement measures that respect that historic character.

#### 2.3.3

CPS will use the Federal Environmental Assessment and Review Process as a mechanism to assess and consider the potential negative consequences of proposed actions on cultural resources.

#### 2.3.4

Interventions proposed by CPS to buildings designated classified under the Policy on Federal Heritage Buildings will be submitted for review to the Federal Heritage Buildings Review Office.

### 2.3.5

In the case of buildings designated recognized under the Policy on Federal Heritage Buildings, interventions proposed by CPS will be reviewed by CPS, except for disposals and demolitions which will be submitted for review to the Federal Heritage Buildings Review Office.

### 2.3.6

Because the policies on National Historic Sites and Federal Heritage Buildings are not identical, consideration of a building under one policy will not preclude its consideration under the other. A building may be designated under one policy and not under the other.

### 2.4

#### **Monitoring and review of ongoing activities**

Management processes will include the review and monitoring of activities that affect cultural resources and their presentation.

### 3.0

#### **Activities of Cultural Resource Management**

### 3.1

#### **Corporate Direction**

The Canadian Parks Service will ensure the application of the principles and practice of cultural resource management in all activities that may affect cultural resources and the historic character of those resources.

### 3.2

#### **Planning**

Effective planning sets out the ways and means by which cultural resources will be cared for and presented. Planning activities flow from policy objectives and adhere to policy principles. Through these activities the Canadian Parks Service ensures that the elements of good cultural resource management practice are in place in all systems and processes.

Long-range direction for the management of the cultural resources at each national park, national historic site and historic canal, is established through the processes of management and service planning. Collections are managed through other appropriate planning processes.

**3.2.1**

Given the multidisciplinary nature of cultural resource management, planning practices will integrate in a timely fashion the contributions of responsible disciplines.

**3.2.2**

Management planning for a national historic site will be based on the commemorative objectives that led to the designation and acquisition of the site. Primary themes developed in the course of management planning will be consistent with that designation.

Where, as a result of further research, it is determined that a primary theme should be changed, CPS will refer the subject to the Historic Sites and Monuments Board of Canada.

**3.2.3**

Management planning that affects cultural resources in national parks will deal with cultural resources on the basis of this policy and will be consistent with human history themes established for a park.

**3.2.4**

Because cultural resources are managed for public benefit, public consultation is essential in planning. The principles of this policy will form part of the terms of reference for all public consultation regarding the management of cultural resources in CPS.

**3.2.5**

CPS will co-operate actively with other appropriate agencies with respect to shared cultural resource management concerns in land use planning, tourism and marketing.

**3.2.6**

If, following the acquisition or establishment of a national park, national historic site or historic canal, additional lands or objects are required to meet program objectives, these will be identified and acquired in accordance with established authorities and planning processes.

**3.2.7**

A national historic site administered by CPS may be set aside pursuant to Part 2 of the National Parks Act to apply regulations under that Act.

**3.3****Research**

Ongoing research and investigation will be carried out in professional and technical domains, as they are essential to the success of cultural resource management. In particular, research activities will help achieve conservation objectives, high quality interpretation and public programs.

**3.3.1**

Research and the results of research will be the basis for activities that have an impact on cultural resources and their presentation.

**3.3.2**

Results of research will be made available to the public in the form of publications and other media.

**3.3.3**

The Canadian Parks Service will co-operate with other professionals, research agencies and individuals to achieve mutual objectives.

**3.4****Conservation**

Conservation encompasses the activities that are aimed at the safeguarding of a cultural resource so as to retain its historic value and extend its physical life. There are within the Canadian Parks Service conservation disciplines that address different kinds of cultural resources. All share a broad concept of conservation that embraces one or more strategies that can be placed on a continuum that runs from least intervention to greatest; that is, from maintenance to modification of the cultural resource.

**3.4.1****General****3.4.1.1**

In planning conservation activities the Canadian Parks Service will ensure first and foremost the basic protection of its cultural resources. With regard to cultural resources the highest obligation is to the protection and presentation of resources of national historic significance.



### 3.4.1.2

In undertaking conservation activities CPS is especially cognizant of the principles of respect for the existing form and material that constitute the historic character of a cultural resource. Conservation activities will therefore involve the least possible intervention to achieve objectives.

### 3.4.1.3

In determining the most appropriate treatment for a cultural resource or a complex of cultural resources, CPS will strike a balance between protection of existing fabric and enhancement, through modification, for public understanding. Respect for the historic character of a resource will be the central consideration in determining the point of balance.

### 3.4.1.4

In determining the most appropriate conservation treatment, consideration will be given to the following factors:

- i) the historic character of the cultural resource as determined through evaluation;
- ii) the physical condition, integrity and context of the resource;
- iii) the impact of the treatment on the integrity of historic fabric and character;
- iv) available documentation and information;
- v) the opportunities for presentation and potential appropriate uses of the resource; and,
- vi) available financial and human resources.

### 3.4.1.5

Activities involving some replacement are the most interventionist of conservation activities and will be the last to be considered.

### 3.4.1.6

For CPS, the reproduction, reconstruction or replication of a cultural resource will be considered as an interpretative option, not as a conservation activity. These activities are addressed in section 3.5.2 on Interpretation.

## 3.4.2

### Maintenance

Conservation involves not just a once-in-a-lifetime intervention to a cultural resource but equally its routine and cyclical maintenance. The Canadian Parks Service will employ con-

servation maintenance to mitigate wear and deterioration without altering the performance, integrity or appearance of a resource.

## 3.4.3

### Preservation

Preservation encompasses conservation activities that consolidate and maintain the existing form, material and integrity of a resource. Preservation includes short-term protective measures as well as long-term actions to retard deterioration or prevent damage. Preservation extends the life of the resource by providing it with a secure and stable environment.

Preservation activities will involve the least possible physical intervention and, in the case of interim measures, be as reversible as possible, so as not to jeopardize long-term conservation options. In the case of long term measures, preservation activities ensure the stability and security of a resource so that it can be kept serviceable through routine maintenance.

## 3.4.4

### Modification

Modification encompasses conservation activities that may change the existing form or materials through treatments, repair, replacement of missing or deteriorated parts, or recovery of earlier known forms and materials. It involves a higher level of intervention than preservation.

Modification may be undertaken in order to satisfy new uses or requirements, compatible with the historic character of a resource, as in the case of appropriate adaptive re-use of a structure; or to reveal, recover or represent a known earlier state of a resource, which is called restoration. Modification may involve some replacement of fabric.

### 3.4.4.1

The Canadian Parks Service will base modification on a sound knowledge of, and respect for, the historic character of the resource; particularly as that character is expressed by the existing form and material of the resource.

### 3.4.4.2

CPS will assess and consider the impact of proposed modification activities on the historic character of cultural resources, and will identify and consider the consequences of modification.

#### 3.4.4.3

Restoration is a modification activity that will require clear evidence and detailed knowledge of the earlier forms and materials being recovered.

#### 3.4.4.4

In the case of sites and structures, modification may include the activities of period restoration, and of rehabilitation for purposes of safety, property protection and access.

- i) Period restoration is the accurate recovery of an earlier form, fabric and detailing of a site or structure based on evidence from recording, research and analysis, through the removal of later additions and the replacement of missing or deteriorated elements of the earlier period. Depending on the degree of intervention, period restoration may be a presentation rather than a conservation activity.
- ii) Rehabilitation is the modification, including adaptive re-use, of a resource to meet various functional requirements while preserving the historic character of the structure.

#### 3.4.4.5

In the case of artifacts, modification includes removal of the products of deterioration such as corrosion, repair, and the infilling of missing parts. Modification also includes restoration, which returns the object or specimen to a known earlier visual state, using compatible construction methods and materials.

### 3.5

#### Presentation

Presentation encompasses activities, facilities, programs and services, including those related to interpretation and visitor activities, that bring the public into contact, either directly or indirectly, with national historic sites, national parks and historic canals. CPS presents these places by promoting awareness of them, by encouraging visitation, by disseminating information about them and about opportunities to enjoy them, by interpreting them and their wider significance to visitors and non-visitors, by providing opportunities for appropriate visitor use and public involvement, and by providing essential services and facilities.

#### 3.5.1

##### General

The presentation of cultural resources offers the public a wide range of opportunities to understand, appreciate and enjoy those resources. The provision of such opportunities will be based on a knowledge of the nature and interests of the public.

#### 3.5.1.1

The Canadian Parks Service will integrate its activities so that efforts at presentation will respect and enhance the historic value of the whole in order to contribute to a positive experience for the public.

#### 3.5.1.2

In planning and implementing the presentation of cultural resources at national historic sites, national parks and historic canals, CPS will co-operate with other agencies on a regional basis to co-ordinate presentation initiatives and thus contribute to regional growth.

#### 3.5.1.3

New structures and buildings at national historic sites will respect and be compatible with the historic character of the site. Such new work will not be detailed in such a way as to be mistaken for an historic structure.

#### 3.5.1.4

Signs at national historic sites and for cultural resources will respect the historic character of those resources. Such signs may be distinctive.

### 3.5.2

#### Interpretation

Interpretation includes the specialized activities by which the Canadian Parks Service communicates an understanding and appreciation of the historic value of particular places, things, events and activities to visitors and the public. This communication may be accomplished through firsthand experience of historic places, appropriate use of cultural resources and the use of media. An understanding of public needs and interests is indispensable for effective interpretation.

#### 3.5.2.1

In its interpretive activities CPS will communicate the historic character of the cultural resources being presented, the historical themes represented at a specific national historic site, national park or historic canal and the value of cultural resource management.

**3.5.2.2**

Where there is a Ministerial designation of national historic significance, the primary interpretive obligation will be to communicate what has been designated as being of national historic significance.

**3.5.2.3**

In selecting the most appropriate means of interpreting cultural resources and themes related to human history, CPS will consider the following factors:

- i) visitor needs and expectations;
- ii) the historic value of the resource;
- iii) the interpretive potential of the resource and its themes;
- iv) the impact of interpretation activities on the resource;
- v) the availability of knowledge on which to proceed;
- vi) opportunities for appropriate visitor use;
- vii) the themes, purpose and objectives of the national historic site, national park or historic canal;
- viii) the relationship of specific interpretive options to the overall presentation of a site; and,
- ix) available human and financial resources.

**3.5.2.4**

Interpretation is an ongoing activity. It will include the maintenance, monitoring and review of interpretation programs.

**3.5.2.5**

Interpretation need not be complex to be effective. The kinds and levels of interpretation may range from simple access to creating a sense of the past.

**3.5.2.5.1****Simple Access**

This form of interpretation offers the visitor access to or experience of a resource that, with minimal support material, speaks for or presents itself.

The Canadian Parks Service will consider this form of interpretation for resources and complexes that have retained their historic uses or function or whose integrity is intact; whose meaning is readily comprehensible; and whose condition will not support more intensive use and development.

**3.5.2.5.2****Publications and Exhibits**

The Canadian Parks Service will provide publications and exhibits when there is a need to offer background, detail and perspective on more complex themes and resources.

**3.5.2.5.3****Creating a Sense of the Past**

Creating a sense of the past for the visitor is an interactive form of interpretation that may use a combination of the following activities: accurate restoration, reconstruction or replication of cultural resources, volumetric representation(s) of cultural resources, reproduction of period costumes and objects, role playing and representations of past activities. Creating a sense of the past is a comprehensive interpretive option that requires the integration of all aspects of the scene or environment being interpreted (for example, landscape treatments should be consistent with period restorations).

The Canadian Parks Service will consider creating a sense of the past as an interpretive option when:

- i) there is a specific commemorative objective to provide the visitor with an understanding of a defined period in the history of a site; and,
- ii) resources and their setting possess sufficient historical integrity to support a complete scene or environment; and,
- iii) there is sufficient understanding of the resource to ensure accuracy of detail; and,
- iv) cost can be justified in relation to historic significance and interpretive potential; and,
- v) in the case of established sites, demonstrated visitor demand or expectations warrant this type of development.

**3.5.2.6**

Reproductions may be manufactured and used in interpretation when:

- i) sufficient knowledge exists for an accurate reproduction; and,
- ii) the original object is too fragile or cannot be provided with a stable display environment; or,
- iii) more than one of an object is required; or,
- iv) an object is to be handled or consumed.

**3.5.2.7**

The use of reproductions will be acknowledged.

**3.5.2.8**

In exceptional circumstances, the period reconstruction or replication of whole structures or complexes may be considered as the best possible means of achieving public understanding of a significant aspect of the past.

Period reconstruction may not be undertaken unless:

- i) reconstruction of the vanished resource would make a significant contribution to historical, scientific or technical knowledge; and
- ii) the cost of reconstruction, including its maintenance and operation, can be justified in relation to the historic significance and interpretative potential of the work.

If these considerations are met, reconstruction may only be considered if:

- a) there are no significant preservable remains that would be threatened by reconstruction; and
- b) there is sufficient research information to support an accurate reconstruction.

**3.5.2.9**

The use of period reconstructions will respect existing cultural resources and will be acknowledged.

**3.5.2.10**

Period reconstruction and reproductions are by definition contemporary work and have no a prior historic value. Because of their special character, however, the principles and practice of cultural resource management may apply to them.

**3.5.3****Special Programs and Events**

The Canadian Parks Service provides a variety of opportunities to promote the understanding, appreciation and enjoyment of cultural resources. Special programs and events offer CPS important opportunities to integrate the presentation of cultural resources at historic sites, national parks and historic canals with related activities in their surrounding communities.

In planning for these activities and uses CPS will be sensitive to the size, nature and interests of existing and potential visitor groups, while acknowledging that not all visitor expectations are compatible with its mandate and resources.

**3.5.3.1**

CPS will encourage those activities that are consistent with the principles of cultural resource management, are appropriate to the specific national park, national historic site or historic canal and are acceptable to CPS.

appropriate to the specific national park, national historic site or historic canal and are acceptable to CPS.

**3.5.3.2**

Where warranted, CPS will develop special programs for targeted groups of visitors.

**3.5.3.3**

Special events and uses will be encouraged where they contribute directly to public appreciation of the historic themes, resources and opportunities of a national park, national historic site or historic canal.

**3.5.3.4**

Special events and uses will respect cultural resources and their historic character and will not impair the safety, experience and enjoyment of visitors.

**3.5.3.5**

Some special events and uses that are otherwise appropriate may depict the past in ways that are not specifically accurate to the site. In cases where CPS permits such events or special uses, these discrepancies will be acknowledged.

**3.5.3.6**

Research and study by others of cultural resources at national historic sites, national parks and historic canals will be encouraged as an appropriate activity when such work respects the principles of this Policy and is compatible with visitor activities.

**3.5.4****Services and Facilities****3.5.4.1**

The Canadian Parks Service will provide the facilities and services necessary to achieve public understanding and appreciation and enjoyment of cultural resources.

**3.5.4.2**

Services and facilities may be provided through contract, lease, licence, concession or agreement.

**3.5.4.3**

The principles and practice of cultural resource management will apply to those contracts, leases, licences, concessions or agreements that affect cultural resources under the Minister's authority.





ICOMOS CANADA - DOCTRINE TASK FORCE

## **PRINCIPLES OF PRACTISE**

**THE CONCERN:** Our cultural inheritance - those combined creations of nature and of man which make up the environment in which we live.

**THE GOAL:** To manage change in this environment in ways which protect and enhance its value.

---

## I AWARENESS/DISCOVERY

1. Protection and enhancement depend on individual and collective awareness of value. Such awareness is a prerequisite and a goal of conservation.
2. All appropriate means of acquiring and developing this awareness must be encouraged. These means include education and training, interpretation, cultural tourism. Cultural resources must at the same time be protected against erosion or pollution by undue exploitation for tourism or other forms of accessibility.
3. Laws and regulations, and related financial and administrative mechanisms, must be based on awareness and design to further the activities of protection and enhancement.
4. Research, investigation and analysis must be carried out by multi-disciplinary teams drawing on a full range of professional expertise as well as community representation and input.
5. Knowledge gathered about a resource must be widely diffused, as a means to greater awareness.
6. The cultural resource itself must be recognized as a historical document. Protection of this document and understanding of its message are fundamental to the conservation process.

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## III ACTION/INTERVENTION/ ENHANCEMENT

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## II UNDERSTANDING/PROTECTION

1. Assignment of cultural value is a prerequisite to intervention and a stimulus to awareness. It must be based on appropriate levels of identification, documentation and research.
2. The process of identifying and inventorying cultural resources must be as broadly-based and inclusive as possible.
3. Precise documentation must be prepared at every stage of the work in the form of analytical and critical reports, drawings and photographs. Every technical and formal aspect of the resource should be included.
4. Protection and enhancement must be based on respect for the significant contributions of every historical period. They must avoid reconstruction based on conjecture.
5. Enhancement to meet contemporary functional needs and the objectives of social integration must be designed to minimize the impact on the values being protected.
6. All interventions must be legible, without being disruptive. They should contribute to awareness.

THE ONTARIO HERITAGE FOUNDATION

**STANDARDS**  
**FOR BUILDING CONSERVATION PROJECTS**  
**GRANT-AIDED BY**  
**THE ONTARIO HERITAGE FOUNDATION**



1. Building conservation projects shall be undertaken only on the basis of a responsible and sufficient investigation of the historical and architectural aspects of the existing building and site.
2. The existing state of the building and site shall be recorded before a project is undertaken, and changes made in the course of a project shall be properly documented in relation to that record.
3. Repair and construction activities shall be phased and managed to protect and respect the historic fabric of the building.
4. Every reasonable effort shall be made to provide a compatible use for a property which requires minimal alteration of the building or site and its environment, or to use a property for its originally intended purpose.
5. The distinguishing original qualities or character of a building or site in its environment shall not be destroyed. The removal or alteration of any historic material or distinctive architectural features should be avoided whenever possible.
6. All buildings and sites shall be recognized as products of their own time. Alterations having no historical basis that seek to blur the distinction between the historic and new portions of the project shall be discouraged.
7. Changes that may have taken place in the course of time are evidence of the history and development of a building or site and its environment. Whenever these changes have acquired significance in their own right, they shall be recognized and respected.
8. Distinctive stylistic features or examples of skilled craftsmanship which characterize a building or site shall be retained and respected. Additional work shall complement and sympathetically enhance the distinctive historic features of the building.
9. Deteriorated architectural features shall be repaired rather than replaced wherever possible. In the event replacement is necessary, the selection of new materials should be treated with sensitivity.
10. The surface cleaning of buildings shall be undertaken only with the gentlest means possible. Sandblasting and other cleaning methods that needlessly erode or damage the historic fabric of the building shall not be undertaken.
11. Every reasonable effort shall be made to protect and preserve archaeological resources affected by or adjacent to the project.
12. Contemporary design for alterations and additions to existing properties shall not be discouraged when such alterations and additions do not destroy significant historical, architectural, or cultural material, and when such design is compatible with the size, scale, colour, material, and character of the property, neighbourhood or environment.
13. Whenever possible, new additions or alterations to buildings shall be done in such a manner that if such additions or alterations were to be removed in the future, the essential form and integrity of the building would be unimpaired.

# **VOLUME I**

# **PROJECT MANAGEMENT**

## **2**

## **PROJECT PROCEDURES**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
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## 1.0 INTRODUCTION

The Canadian Parks Services' (CPS) National Historic Sites are intended to protect heritage resources and to commemorate persons, places, and events that have been declared to be of national significance in Canada's development. Commemoration most frequently takes the form of plaques and shared initiatives with provincial or other organizations. This section is concerned with the conservation of historic fabric in these historic parks and sites.

Most of these procedures are applicable to any designated historic property where the protection and enhancement of heritage character are primary concerns. This document is meant to supplement available material on project delivery systems, most of which have been developed to deal primarily with contemporary design and construction.

### 1.1 DEFINITIONS

**Conservation Process:** the sum of all activities required for the logical selection, stabilization, conservation, and continuing preservation of a historic site or structure.

**Conservation Project:** a co-ordinated program of research, design, and implementation intended to protect a specific heritage resource or group of resources.

**Cost Estimates:** In this section, classes of cost estimates are defined as follows:

- a. Class "D":  
This class of cost estimate, based on comparisons with similar projects, is used in the conceptual stage of a project. Those seeking approval in principle will employ it to indicate the magnitude of expenses.
- b. Class "C":  
This class of cost estimate is based on an approved concept, after methods of implementation have been established. It is developed by qualified personnel who assess current market values of materials, equipment, installation expenses, and so on.
- c. Class "B":  
This class of cost estimate is based on a preliminary design after all technical and functional data to complete the project is obtained.
- d. Class "A":  
This class of cost estimate is based on a final design, plans and specifications. The cost is calculated using

known quantities and qualities of materials, equipment, installation expenses, and so on, required to complete the project.



*Bellevue House, Kingston, ON*

**Phase:** a primary breakdown in the conservation process which reflects a shift in the orientation of the work being done. Its beginning and end should be clearly marked by approvals.

## 2.0 CONSERVATION PRINCIPLES

### 2.1 CONSERVATION

The conservation of heritage resources can be defined as those activities intended to preserve their form and fabric. Any historic object is constantly in friction with its physical, climatic, social, and economic environment. Conservation aims to reduce the effects of this friction.

Historic fabric can be conserved by isolation, preventive maintenance, stabilization, rehabilitation, adaptation and restoration or any combination of these. These processes, it should be emphasized, are only the means of conservation. The goal of conservation is the preservation of historic fabric.

### 2.2 CONSERVATION PROJECT

Most conservation projects are complex, requiring a wide range of skills and expertise at various points. Projects can be simplified, however, by an established sequence to preserve a logical process of events. It also allows conservation projects the greater lead time they require as compared to conventional design projects.



A conservation project only partly achieves conservation of a structure or site. The project seldom makes provision for the fact that an object continuously interacts with its environment. In the past conservation projects did not provide for preservation either before (interim stabilization) or after (maintenance) the project. A conservation project, however, is only one part of the conservation process.

### 2.3 CONSERVATION PROCESS

The conservation process described here is a managerial procedure developed to meet the needs of the CPS program. In this section the process is broken into seven phases, each having a specific objective and activities and ending with a formal document and approval. This sequence applies most directly to the development of newly acquired sites.

Many conservation projects involve changing and upgrading already established sites. These projects may be funded as part of recapitalization or even maintenance programs rather than as part of new development. Not every project will go through all seven phases, and the degree to which the content of each is developed may be adjusted to suit the circumstances of a particular site.

The basic principles, however, remain the same: all work affecting historic properties must involve interdisciplinary project teams, and all work must follow a logical sequence of phases.

Whether the project is a major site or a small structure, the objective of the conservation process remains the same: to ensure adequate planning and control throughout and to maintain a consistently high quality of development for CPS's National Historic Sites.

The procedures described in this section are designed to:

- a. establish common terminology and areas of responsibility for historic sites and structures;
- b. outline a sequence of clearly defined tasks so that work is done efficiently and progress can be monitored;
- c. set out the frequency and procedures for progress reporting;
- d. identify the levels of approval for the project and how they are obtained;
- e. organize the management of a project by a multidisciplinary team to ensure adequate planning and control from the beginning of the project to hand-over of the facility to the client; and
- f. provide a checklist of activities for monitoring resources, costs, and procedures.

#### 2.3.1 Management

Conservation requires the co-ordinated input of many skills, direction to ensure that each phase obtains the right skills at the right time, and decision-making ability when confronted with alternate courses of action. However, unlike contemporary work where decision making is most effective when vested in a single individual, conservation projects must rely on decision by consensus. The protection and enhancement of historic properties requires a wide range of skills, including historical and archaeological research, materials conservation, architecture, landscape architecture, engineering, recording, interpretation and planning. The only efficient way to co-ordinate and take advantage of this input is to have, for each project, an established project team to whom decision making is delegated.

##### a. Project Team:

The project team works to produce a suitable result within the constraints of time, cost, and quality. To do this, it performs two broad functions:

- Development: co-ordinating all demands – such as the user's needs, the project's physical and financial constraints, and CPS policies – into a general definition of project requirements
- Production: ensuring completion of the design, construction, and continuing conservation of the facilities in a manner that will satisfy the requirements

The team's composition and size depend on the complexity and size of the project. As the project evolves, members are added or dropped to meet the requirements in each phase.



*Archaeological Excavation, Prescott, ON*



## b. Consultants:

Specialists outside CPS or the federal government may be engaged at any time during a project to carry out defined tasks in connection with planning, investigation, or implementing the conservation project. These consultants may operate outside the project team and report to a team member of a certain discipline, or they may become team members reporting to the project manager.

## c. Client:

A project team normally has line responsibility to regional management. For some projects, regional management may be represented on the team by a project manager.

There is also functional responsibility, however, to the Director-General, National Historic Sites, who is responsible for the interpretation and application of National Historic Sites Policy.

Decisions by the project team affect the central mandate of the CPS program: "To protect for all times those places which are significant examples of Canada's natural and cultural heritage and also to encourage public understanding, appreciation and enjoyment of this heritage in ways which leave it unimpaired for future generations."

Policy issues are therefore central to the team's deliberations.

2.3.2 *Procedural Frameworks*

The CPS Management Directive 3.2.1, A Planning Framework for National Historic Sites, sets out the following for preparing management plans:

- Themes and Objectives
- Management Guidelines
- Terms of Reference
- Plan Alternatives
- Management Plan(s)

The conservation process framework described here is more detailed and comprehensive with regard to management of the physical resource. It is intended to regulate the selection, research, design, implementation, and continuing preservation activities which comprise the conservation process for a historic structure

or landscape under CPS control. The following phases are used to define a general framework of activity:

- a. Conservation Commitment
  - Identification
  - Departmental Commitment
  - Themes and Objectives
- b. Initial Conservation
  - Initial Architectural and Engineering Survey
  - Initial Documentary Research
  - Interim Conservation and Maintenance Program
  - Management Guidelines
- c. Property Research
  - Graphic and Photographic Recording
  - Architectural and Engineering Analysis
  - Historical and Archaeological Research
  - Material Conservation Studies
  - Interpretive Curatorial/Visitor Services Analysis
  - Research Summaries
  - Concept Alternatives
  - Development Concept
  - Development Plan
- d. Conservation Project Brief
  - Resource Conservation Briefs
  - Interpretation Briefs
  - Action Plans
- e. Conservation Design
  - Design Development
  - Preliminary and Final Drawings, Specifications, and Conservation Guidelines.
- f. Design Implementation
  - Conservation Programming and Tendering
  - Conservation Works: removals, repairs, replacement, new construction
  - Documentation
  - Conservation Project Report
- g. Continuing Conservation
  - Maintenance Programming
  - Monitoring
  - Operations

The procedural frameworks described here have the protection of heritage resources as their first consideration. The role of the Architecture and Engineering Service (A&ES) is essentially advisory in Phase I, contributory to a project team in Phases II, III and IV, central in Phases V and VI and contributory in Phase VII. The following comments relate A&ES's responsibilities for the conservation process to those of other disciplines, and to the overall objectives of the National Historic Sites Program.

### 3.0 PHASE I – CONSERVATION COMMITMENT

Phase I in the conservation process for CPS' historic sites and structures begins with a formal commitment by the Minister for their protection. This commitment is normally made following recommendations by the Historic Sites and Monuments Board of Canada. It is formalized by acquisition, through purchase or other arrangement, and the establishment of a national historic site under the National Parks Act. Other commitments may be generated through formal agreements or initiatives, as described in the 1979 Parks Canada Policy.

#### 3.1 CRITERIA

The following criteria for designating national historic parks are set out in the Parks Canada Policy document:

- a. the place has been identified as being of national historic significance or as being prominently associated with persons or events of major national historic significance;
- b. the place possesses integrity; it includes the original site and ideally at least, some original materials and work;
- c. the place relates to a theme of Canadian history which is under-represented in the national historic parks;
- d. the place has excellent potential for illustrating Canadian history;
- e. the place includes significant authentic historic resources; and
- f. it is possible to protect the historic resources and their authentic environment within the lands available and at an acceptable cost.

#### 3.2 ACTIVITIES

The procedures and research that establish a conservation commitment are initially the responsibility of historians and systems

planners oriented to the requirements of the Historic Sites and Monuments Board of Canada. A&ES personnel may provide structural and historical assessments to clarify the physical condition and integrity of the property.

Early decisions based on documentation available at this phase have significant implications for all subsequent phases.

#### 3.3 CONCLUSION OF PHASE I

Thematically, Phase I concludes with ministerial approval of the recommendation for acquisition and the implementation of the type of preservation commitment advised by the Historic Sites and Monuments Board of Canada. Functionally, the final agreements and arrangements, particularly where outright purchase by Environment Canada is not intended, must contain provisions for managing and controlling the conservation process, i.e. effective research, design, and implementation of conservation proposals in accordance with departmental objectives.

### 4.0 PHASE II – INITIAL CONSERVATION

The following summary identifies the activities in Phase II and clarifies the role of A&ES and other professional staff. In this phase, the project gets underway, its scope and terms of reference are brought into focus, and interim conservation and maintenance are begun.

#### 4.1 INITIATION OF CONSERVATION PROJECT

The conservation process is initiated with receipt of the property by the Department or finalization of other agreements.

##### 4.1.1 *Project Dossier*

Parks Canada Policy (1979) states that comprehensive records in the form of a project dossier will be established and maintained for all historic resources related to national historic parks. This dossier should be established immediately after receipt of the property by the department. For those who have a role in its conservation, the dossier will become the storage and retrieval point for all important information related to the property. It will form the permanent record of the progress of the project and the methods used in the conservation of the property.



*Strait's Store, Dawson, YT*

#### 4.1.2 Takeover Survey

Regardless of how soon detailed surveys are to take place, A&ES must complete a takeover survey of all structures and landscape elements on the site as soon as possible after its transfer to the department.

The takeover survey aims to: (1) record the form and appearance of the structures and landscape with reference photographs, basic plans, elevations, and details of construction and services; and (2) assess the physical condition of the structure, materials, work, and design. Defects and potential sources of further deterioration must be noted. A preliminary estimate for conservation works should be prepared. Interim conservation and maintenance are usually necessary before long-term conservation measures can be implemented.

The takeover survey provides the basis for any immediate conservation, the interim maintenance program, and A&ES input to the Themes and Objectives document.

#### 4.2 INTERIM CONSERVATION AND MAINTENANCE PROGRAM

The most important activity in Phase II under direct A&ES responsibility is the drafting of an interim conservation and maintenance program for the site and every structure and landscape element on it. Although this program is independent of the Themes and Objectives document, it should be prepared in consultation with historians, archaeologists, planners, and interpreters.

The program aims to protect the property from deterioration without prejudice to existing historic fabric and without restricting the selection of further long-term conservation options regardless of how definite they might appear in this phase. It can consist of an interim maintenance manual and/or a list of conservation recommendations.

The interim maintenance manual is prepared by A&ES for the guidance of the area superintendent and the general works staff. It describes short- and medium-term measures, routines, procedures, and schedules designed to protect the heritage resources until long-term conservation is implemented.

The list of conservation recommendations is usually prepared for the responsibility centre manager. It normally includes immediately required works of a temporary or renewable nature necessary to deal with defects threatening the stability of the structure. (See Vol. IV.3.1 "Interim Protection Design Standards" for guidance on preparing for and implementing this initial conservation.) The list can also contain research requirements.

#### 4.3 THEMES AND OBJECTIVES

The preparation of a Themes and Objectives document is the responsibility of the historic sites planning disciplines. A&ES may provide input based on its initial survey of the site.

#### 4.4 CONCLUSION OF PHASE II

Phase II ends with the initial conservation activity in place and a Themes and Objectives document approved by senior management.

### 5.0 PHASE III – PROPERTY RESEARCH AND PROCEDURES

In Phase III, A&ES staff participate with members in other disciplines to form a management planning team. Team members carry out detailed investigations in their respective fields on common problems and potentials for the development of the site.

With a view to preparing conservation proposals, A&ES staff will put together the following from the general research:

- a. reports outlining the physical evolution of the site and its individual structures and landscape elements;
- b. reports assessing the current condition of the structure and fabric of the heritage resources and whether their physical environment has a benign or malignant effect on conserving these resources; and
- c. studies of potential functional requirements for these resources in an eventual development of the site.

To achieve these research objectives, the general planning team may form research subteams. In some cases, the research required to develop and substantiate management planning will be less than that necessary to bring items "a", "b", and "c" to a level to support final conservation design.

A clear co-ordination of, and mutual understanding between members of the various disciplines must be established to ensure that all the research is directed efficiently towards the immediate needs of management planning and to the future demands of conservation design.

#### 5.1 GRAPHIC AND PHOTOGRAPHIC RECORDING

The scope and type of recording carried out in Phase III depend on the size and complexity of the property. However, its purpose remains the same, namely, to provide:

- a. a comprehensive, permanent archival record of the heritage resources as acquired, sufficient for future research and reference;
- b. control drawings and reference photographs for detailed investigations of the heritage resources; and
- c. a detailed reference tool for developing design drawings for conservation.

Recording is normally carried out by departmental recording personnel or qualified consultants under the direction of the A&ES member assigned to the project.

#### 5.2 ARCHITECTURAL, ENGINEERING AND LANDSCAPE ANALYSIS

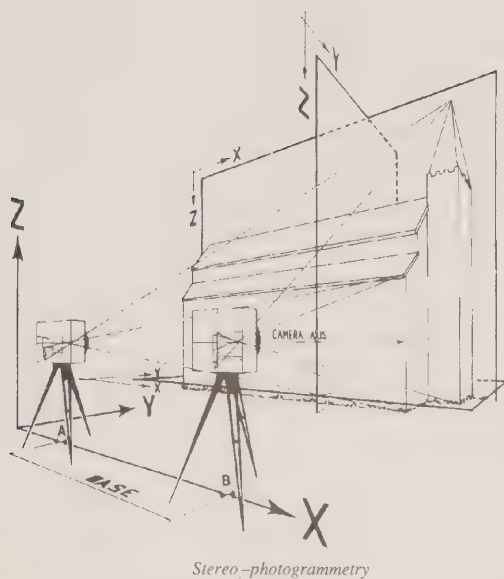
The purpose of the investigations by architects, landscape architects, engineers and technologists is to provide the required information on physical evolution, current physical condition, and constraints and opportunities for development.

Procedures may include direct inspection, on-site and laboratory analysis of samples, and compilation and analysis of information gathered from the heritage resource itself, from comparable sites, and from historical and archaeological research. Non-destructive testing must be used as extensively as possible. Where necessary, selected hidden parts can be examined in this phase, with major stripping postponed until actual conservation begins.

All defects and areas of decay must be noted, their causes identified, and technical options to remedy them presented with Class "D" estimates of their costs.

Local environmental studies may include an analysis of climatic conditions, including rainfall, wind, snowfall, temperature fluctuations, atmospheric pollution, permafrost, and seasonal durations. Where warranted, there may also be analysis of socio-economic constraints, such as existing and potential traffic and visitation patterns.





### 5.3 DEVELOPMENT CONCEPTS AND PLAN

Additional studies prepared by historians, archaeologists, material conservators, curators and others during a property research phase provide information complementary to that developed by A&ES. When these studies are carried out simultaneously, each discipline is able to draw on the information being uncovered by others.

It is the responsibility of the project team to assemble and distill the research data into one or more development concepts with suggested strategies for implementation. A development concept report should be prepared for presentation to senior management to summarize these development concepts and recommend a course of action. An approved concept becomes the basis for a development plan.

The plan should:

- a. present an overall picture of the significance, history, function, development, and condition of the property;
- b. give a final statement of purpose for the site;
- c. review the approved development concept and information on project phasing and Class "D" estimates; and
- d. provide a comprehensive implementation strategy for the site.

### 5.4 CONCLUSION OF PHASE III

Phase III ends with a development concept and plan approved by senior management.

## 6.0 PHASE IV – CONSERVATION PROJECT BRIEF

A conservation project brief (Phase IV of the conservation process) should be prepared and approved before design development. It acts as a term of reference for members of a design team.

The brief should describe, in sufficient detail for preliminary and final design activity to proceed, the purpose of the conservation, costs and schedules, technical needs and requirements for interpretation, contemporary facility and services, and public safety.

The conservation project brief is a formal document integrating interpretation briefs and resource conservation briefs. Both types of brief are based on the development plan approved at the end of Phase III.

### 6.1 RESOURCE CONSERVATION BRIEFS

A resource conservation brief pertains to the protection of heritage resources and the physical conservation required to stabilize, modify, or reconstruct historic structures and landscape elements. It outlines the objectives of the protection program, the resources required to best protect existing historic resources, and the activity required to provide a context for interpretation. A resource conservation brief will, depending on the requirements of the project, vary in scope and detail, but should:

- a. brief the design team on the conservation problem and the circumstances of site development;
- b. identify reference documents and resources available;
- c. present the technical requirements for architectural, structural and landscape work, the mechanical and electrical servicing, fire protection, security, communication;
- d. define the criteria to be used in evaluating design options, recognizing such variables as protection of historic fabric authenticity in restoration, economy, safety, and convenience of use;
- e. outline the schedule for the remaining phases of the conservation process; and
- f. provide Class "C" cost estimates and financial allocations based on capital budgets and five-year forecasts.



Supporting documents, when included with the brief, should have sufficient illustrations such as period maps and plans, and appropriate drawings and sketch plans of the conservation to allow assessment of the historical significance of the project.

## 6.2 INTERPRETATION BRIEFS

An interpretation brief is based on an interpretive plan, which describes the objectives of the commemoration program, the context for conservation, and the resources required for visitor interpretation such as structural facilities, artifacts, various communication devices, staff, and financing. The brief gives sufficient information to provide both technical and functional guidance to the design team.

## 6.3 CONCLUSION OF PHASE IV

Ideally, interpretation briefs and resource conservation briefs will be prepared concurrently by a project team to ensure a co-ordinated approach to site development. The conservation project brief then simply amalgamates both. If produced separately, the briefs will need to be reviewed and modified for compatibility. It is important that this co-ordination be resolved before the design phase begins.

Phase IV is complete when a final conservation brief has been approved by management.

# 7.0 PHASE V – CONSERVATION DESIGN

During Phase V, preliminary and final design drawings, specifications, and estimates are prepared for the conservation of heritage resources and the creation of an interpretive program. The research of the team members of the various disciplines is largely complete; however, the design team will include these members as well as Interpretation and A&ES staff to ensure that the research data is translated adequately into structural, landscape, and communication design.

Additional property research may be required at any time during the design process, as questions of detail arise and as new possibilities come to light.

In some cases, one design team may prepare working drawings and specifications for all aspects of the site development, including both capital works and the maintenance programs. In other cases, separate design teams may undertake the conservation and maintenance of different structures, landscape elements, and

artifacts. Using separate design teams requires a project team to coordinate work to ensure consistent development and any necessary adjustment.

## 7.1 PRELIMINARY PLANS AND SPECIFICATIONS

Under the terms of reference established by the conservation project brief, the design team prepares preliminary plans and specifications. These will normally include:

- a. plans, elevations, perspective views, and models of the proposed configuration for structures, landscape elements, and interpretive facilities;
- b. notes and explanations concerning differences between existing fabric and conjectured earlier form and function;
- c. statements about the certainty or conjecture in any restoration of earlier appearances;
- d. a narrative of proposed materials and finishes;
- e. a narrative of intended function and use of the property;
- f. an outline of proposed operating and maintenance programs; and
- g. Class “B” estimates and proposed project scheduling.

Preliminary plans and specifications will normally describe one conservation proposal. In some cases, however, the entire plan or a portion of it will require options. The preliminary plan is presented to the project team and to management as the consensus of the design team. Approval and or direction on changes are recorded and appended to the conservation project brief. The design team then has a more detailed direction on the course of conservation to be adopted for the final specifications and working drawings.

## 7.2 FINAL CONSERVATION DESIGN

The final conservation design requires the following:

- a. detailed working drawings and specifications, as required, to implement Phase VI;
- b. detailed Class “A” estimates and bills of quantity;
- c. schedules of priorities, project phasing, and completion dates; and
- d. techniques and specifications for specific procedures required to implement the conservation scheme.

The preparation of the final conservation design should involve team members of all disciplines and specialists contributing to the overall site development such as service and utility engineers, fire prevention and security specialists, and display designers, as well as those who will be responsible for post-development operation and maintenance.

### 7.3 CONCLUSION OF PHASE V

Phase V ends with the appropriate management approval of the final working drawings, specifications, and estimates for the conservation scheme and the allocation of financial and human resources for the execution of the work.

These documents should be initialed by all disciplines represented on the project team, to ensure that they represent a true consensus.

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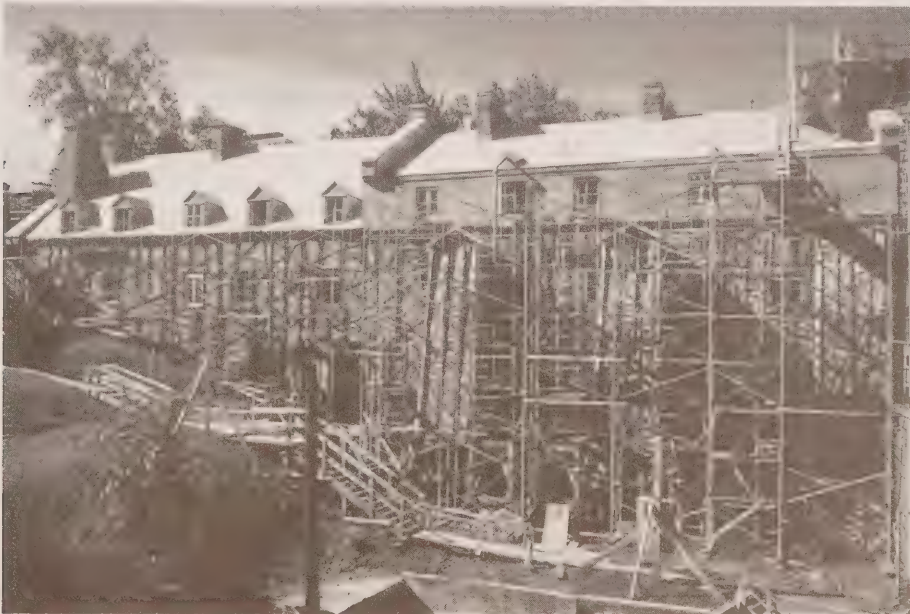
## 8.0 PHASE VI – DESIGN IMPLEMENTATION

The actual construction and execution of the conservation scheme takes place during Phase VI. All of the normal construction activities must be properly looked after, as well as the many specialities inherent in a conservation project. Allowance must be made for any required stripping and preparation of the site and for any alterations to the design which may then arise. The quality of the work must be closely monitored, the progress and techniques used adequately recorded, and the property readied for operation.

### 8.1 CONSTRUCTION PROGRAMMING AND TENDERING

The proposed construction must be divided into “work packages” or collections of related tasks that will ensure an efficient sequence of activities in view of previously approved allocations of funds, time, and human resources. These activities must be co-ordinated to ensure that specialists provide input at the proper time to execute the construction efficiently. It will be necessary to arrange for:

- a. the necessary building trades and operations to be organized similar to contemporary construction methodology;
- b. an archaeologist to be available during any excavation work to identify and record any features uncovered;
- c. the removal and safekeeping of any components of the structure to be conserved off site or held and returned after construction;
- d. special materials, treatments, artisans, and conservation workshops or studios peculiar to the conservation; and
- e. selective removal of materials and opening of the structure so that the designer can further assess fabric previously covered to confirm or revise the work specified in the conservation design.



*Dauphine Redoubt, Quebec City, PQ*

## 8.2 RECORDING AND DOCUMENTATION

During Phase VI, previously inaccessible elements of the property revealed during construction must be recorded to augment the “as-found” records of Phase III. The conservation techniques themselves should be documented for future reference, and for integration into the conservation project report. Finally, a set of “as-built” or “as-conserved” documents should be prepared to form the basis for future maintenance or subsequent conservation and to provide comparative information for wider distribution.

The construction records need not be done by a full recording team. They may be prepared by on-site staff and supervisors with assistance from an experienced recorder, as long as the methods and format of recording rely in part on modifying “as-found” or working documents and can be integrated with other property records.

## 8.3 CONSERVATION PROJECT REPORT

The conservation project report should be prepared at the end of Phase VI to summarize the entire progress of the project for future staff reference and for general distribution of the information for other CPS project teams, outside conservation agencies, and individuals. It should make as critical and unbiased an appraisal of the conservation project as possible and include:

- a. the general background of the project and a summary of research and conclusions;
- b. relevant illustrations and extracts to clarify the nature of the design development and implementation; and
- c. a bibliography and reference section to enable future researchers to find all the documentation gathered during the research and any additional references used during the project design and implementation.

## 8.4 CONCLUSION OF PHASE VI

Phase VI ends with the filing of the conservation project report and the formal transfer of the site to local staff.

## 9.0 PHASE VII – CONTINUING CONSERVATION

Unlike other properties or assets, historic sites are to be maintained in perpetuity. A careful operations and maintenance program must therefore be put into effect and a formal monitoring program instituted and reviewed regularly.

## 9.1 MAINTENANCE MANUAL

A maintenance manual must be prepared for every historic site or for individual heritage resources at larger sites. The groundwork for the manual should be prepared by the design team as part of the conservation design process.

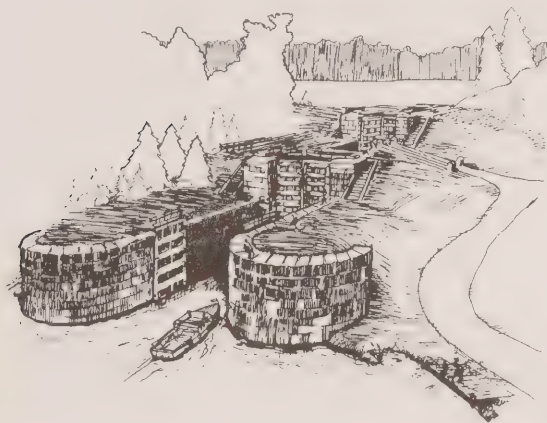
The manual should be able to serve as a technical reference document for CPS’s Maintenance Management System or other components of the Asset Management and Information System. It may include all or some of the following:

- a. Data base:
  - Basic physical characteristics of the site in the form of reference plans and drawings and a summary of site evolution.
- b. Housekeeping program:
  - Maintenance routines performed by site personnel throughout a season with respect to conserved fabric and grounds, visitor facilities, and displays and interpretive material. The purpose of these routines is to provide adequate levels of presentation, security, and protection from decay.
- c. Seasonal inspection programs:
  - Detailed inspection and repair program to be carried out by technical staff and site personnel on an annual or semi-annual basis, or as determined by overall asset management programming. Such programs may lead to more extensive testing, cleaning, and repair of historic materials and their supporting mechanical systems than is possible during normal operating periods, using maintenance or recapitalization funds.
- d. Periodic works program:
  - Conservation activities performed on a long-term cyclical basis to upgrade or replace resource components such as roofing materials or exterior finishes. These activities may involve contractors, and would normally form part of a recapitalization program.
- e. Emergency works program:
  - Standby procedures to be implemented in case of unexpected damage to historic sites and structures. The purpose of this program is to ensure commonly agreed upon and understood responses to emergencies and a clear delegation of responsibility.
- f. Monitoring projects:
  - On-site technical studies carried out over a specified period to evaluate design and behavioural characteristics. They may be required as a follow-up to site development or as a direct response to reports by maintenance personnel of evidence of instability or decay. Although not a part of recurring maintenance, such projects may be appended to the manual from time to time to be co-ordinated with regular maintenance.



## g. Development projects:

Although not part of regular maintenance programming, the maintenance manual should identify the procedures for initiating a new development or recapitalization project. Reporting sheets from the housekeeping, seasonal inspection, periodic works, or emergency works programs, or from monitoring projects, may be used for setting up a project. Large-scale projects will require a project team and a return to Phase II of the conservation process.



*Jones Falls, Rideau Canal, ON*

### 9.1.1 Maintenance Program

The maintenance manual provides the basic directions for implementing a maintenance program on site. Financial and human resources required for program operation should be identified by the project team in Phase VI and used for formalizing the hand-over of the site to local personnel, which initiates Phase VII.

## 9.2 OPERATIONS

As with maintenance, resources required to implement the operating programs should be identified by the project team in Phase VI. A review should also be established to ensure periodic assessment of site operations, particularly as they affect the long-term preservation of heritage resources on site.

## 9.3 CONCLUSION OF PHASE VII

Phase VII is open-ended. From time to time, part or all of a site may require significant upgrading or recapitalization. In this case, Phases III to VI of the conservation process will be reimplemented to ensure the same level of co-ordination and control as with a newly acquired site.

Phase VII has the same main goal as the conservation process – to protect heritage resources. In the case of National Historic Sites, the primary objective is to protect, for all time, heritage resources at places associated with persons, places, and events of national historic significance and to encourage public understanding, appreciation, and enjoyment of this heritage in ways which leave it unimpaired for future generations.

## 10.0 REFERENCES

Environment Canada: Canadian Parks Service Management Directive: 3.2.1., Management Planning Process for National Historic Sites, Ottawa.

Environment Canada: Parks Canada Policy. 1979. Ottawa.

*Illustrations are the property of the Heritage Conservation Program, unless otherwise noted.*





# **VOLUME I**

# **PROJECT MANAGEMENT**

## **3**

## **INFORMATION MANAGEMENT**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
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ORIGINAL DRAFT: DAVID BOUSE

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## 1.0 INTRODUCTION

This article provides guidance and instruction for Architectural and Engineering Services (A&ES) personnel engaged in conducting analytical investigations or predesign analysis of historic structures and landscape features. Its purpose is to ensure that the information compiled is properly managed and utilized.

The Parks Canada Policy of 1979 states that comprehensive records in the form of a complete dossier will be established and maintained for all historic resources related to national historic sites. When applicable, the technical information obtained during analytical investigations should be part of the complete dossier.

### 1.1 BACKGROUND

Architects, engineers and other conservation staff gather considerable original technical information on historic sites. This information is frequently acquired to provide the necessary background for planning and design purposes. Much of this technical information is expensive to obtain and irreplaceable.

### 1.2 SCOPE

The three most common sources of this information are heritage recording; architectural, engineering and site analysis; and conservation implementation work. This section describes general recommendations for information management systems for technical records and specific recommendations for records produced during the architectural, engineering and site analysis.

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## 2.0 APPLICATION

The guidelines in this article apply to all documentation produced during the predesign analysis for stabilization, development or maintenance of heritage resources. They apply to fieldbooks, reports, photographs, drawings, building components and other materials that are produced and received in connection with the examination and investigation of historic structures and landscape features.

When copies of record drawings and other types of "heritage records" are used as reference documents by the engineer or architect to note locations of specimen samples, measurements for deformation studies and so on, the marked copies become an "original document" and should be treated as described in Section 4.0 of this article.

The guidelines in this article are designed to supplement the Public Records Order, the General Records Disposal Schedules (GRDS) for the Government of Canada, Treasury Board Information Management Policies and Canadian Parks Service (CPS) records management procedures.

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## 3.0 GENERAL CONSIDERATIONS

When planning an information management system for documentation produced during project analysis, consider:

- a. ease of access during and after the active life of the project;
- b. simplicity of organization;
- c. economy of equipment and staff requirements;
- d. safety (loss or damage);
- e. accountability to ensure that appropriate procedures are followed;
- f. flexibility to accommodate project and personnel differences; and
- g. co-operation with other technical units.

Advice and assistance on selecting compilation techniques can be provided by designated records officers in regional offices or program headquarters.

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## 4.0 RETENTION AND DISPOSAL CONSIDERATIONS

All important information obtained during the predesign analysis should be incorporated into the complete dossier in the form of a written brief or summary report.

To simplify the problems of retention and disposal for the remaining collection of detailed records, divide the analytical information into five general categories:

- a. Working Papers:  
Rough notes, preliminary drafts, calculations and other working papers used in the preparation of reports and drawings may not need to be retained once the finished report or drawing has been produced. If these records might be needed in future, they should be retained or turned over to CPS records management staff.
- b. Common Original Records:  
Reports, memoranda, papers, data forms, field notes,

sketches, annotated drawings and other common types of information obtained during the analysis should be retained in a logical order, close at hand, as long as required for project purposes. This information should be turned over to CPS records management staff (or designated document centres) prior to transmittal to the National Archives of Canada for full retention according to the general schedules.

c. Special Original Records:

Because of special storage requirements, some forms of information are best kept separate (i.e. colour transparencies, negative film, large-format drawings, building components and other bulky or delicate forms of information). While it is usually preferable to keep analytical information in a central location for each site, these special forms of records normally preclude such organization. A complete index and cross-referencing system should be used whenever these records are separated from the main body of information.

d. Original or Difficult to Obtain Copies:

Photographic prints and xerographic copies that are difficult to obtain, photostats, polyester duplicates of drawings, duplicate negatives, reductions of drawings and similar types of copies should be considered in a special category for retention and disposal. These forms of duplicate records are often costly or impossible to replace. It is good practice to maintain all of these types of copies with the special original records (divided according to similar types) or with the common original records for the duration of the project. While it is not mandatory to maintain these copies for archival retention, it is usually advantageous to maintain them in the office or at the site for future use.

e. Other Copies:

Other types of duplicate information obtained during the analysis should be retained as long as required for project purposes. These types of copies include xerographic copies or transcripts of historical and archaeological reports, excerpts from books and journals, diazo copies of record drawings, maps and aerial photographs and other copies of information obtained from readily accessible sources. These copies should be indexed, referenced and maintained with the main body of information, but need not be kept for archival retention when no longer needed for the project. Indices of these copies should be kept with the project dossier to indicate the extent of references used during the analysis.

## 5.0 RECOMMENDATIONS

### 5.1 FOLLOWING EXISTING SYSTEMS

Document control and information management procedures for the technical information on each project should either follow or be compatible with, existing records systems set up with the organization. If a comprehensive system is not already in use by the engineering and architecture unit, one should be created in accordance with the Public Records Order.



### 5.2 CONSIDERATIONS WHEN COMPILING INFORMATION

When architects and other professional staff are determining their approach to compiling information on the analysis of a particular site, they should apply the following questions to the technical data. These questions provide a rationale for organizing the information in a systematic manner which will reduce the risk of misplacing important data.

- a. Who will be using the information?
- b. What types or forms of records will best serve project requirements?
- c. What are the most logical methods of setting down and compiling the information?
- d. Can the information stand alone or must it be viewed in a larger context?
- e. Who will be setting down and receiving related information and over what time period?
- f. Will the information be valuable for future maintenance or research?



- g. Will the information be available in a more permanent or more accessible form somewhere else?

Establish a sequence of examination prior to conducting the investigation. Compile the field notes accordingly. Observations may be set down in field notes, loose-leaf binders or printed forms during the on-site investigation. The Assets Inventory System forms may be used or the examiner may prepare (and have printed) forms tailored to the project.

### 5.3 USE OF INFORMATION

When frequent access to the information is needed, users should have possession of or convenient access to, the stored records. Copies of bulky or delicate original records should be used in lieu of the originals. Design staff and technologists should have complete access to the applicable files, field notes, photographic prints and notes in order to use the analysis findings effectively.

### 5.4 DISTRIBUTING INFORMATION

Technical information obtained during the analysis should also be available to other members of the conservation project team. To reduce costs, it is usually sufficient to prepare and issue written briefs and a summary assessment, investigation, analysis or feasibility reports, to the other disciplines and to management. These documents provide a comprehensive and concise picture regarding the analysis. Field notes, photographs and other forms of detailed information should be retained by the engineering and architecture staff and made accessible to other team members on request.

Wider distribution of information on a specific historic site or on methods of investigating certain types of historic sites may be achieved through special distribution channels (i.e. by unpublished reports being sent to selected organizations or by publication in professional bulletins). Public access to detailed technical information held by the CPS may be given in accordance with the terms and conditions established by the Minister.

### 5.5 PRESERVING AND DISPOSING OF INFORMATION

Documents identified as having long-term value should be transferred to the National Archives after five years or as soon as practicable. This will ensure proper retention and facilitate research.

All original records produced or obtained during the analytical investigations of architectural, engineering and site features should be considered to have long-term value. Original or dif-

ficult to obtain copies may have long-term value depending on the importance of the information to the integrity of the project dossier. If not identified for long-term retention, such copies should be considered for alternative uses, such as on-site retention for reference during maintenance. Working papers and easy to obtain copies can be discarded if not suitable for archival retention in accordance with GRDS procedures.

Engineering and architecture staff who have compiled technical information or who may later want access to the information should advise departmental staff during the final review process before archival preservation or other disposition.

### 5.6 REVIEWING PROCEDURES

Departmental engineering and architecture managers should assess the applicable technical records control and information coordination procedures used for analysis data, to evaluate:

- a. the effectiveness of existing facilities to meet engineering and architecture storage and reproduction needs;
- b. the ability of existing methods or systems to keep track of technical information in the complete dossier; and
- c. the need for revising guidelines and standards issued to A&ES staff involved in the process of setting down and using information on the analysis of historic sites.

## 6.0 RESPONSIBILITIES

### 6.1 REGIONAL ENGINEERING AND ARCHITECTURAL OFFICES

Regional managers should maintain an up-to-date listing of the analytical activities for all historic sites and structures within their regions. Engineers and architects should advise the regional manager of the anticipated analytical requirements, planned investigations, ongoing analysis, finished reports, transmittal to the dossier and the updating of information. Other regional staff and field officers should advise regional managers on the preparation, use, safekeeping, storage and transmittal of technical information.

Each region should provide the Director General, Architectural and Engineering Services (Environment Canada), with a complete summary of the above listings. For ease of reference, listings should include:

- a. site name and location;
- b. name of structure or landscape element;
- c. number of sets or volume of analytical information;
- d. reference numbers, preparation dates and authors;

- e. brief description of contents;
- f. location(s) of records (including microfilm copies); and
- g. other applicable comments.

Each region should transmit analytical records considered to be of archival value to its CPS records management unit or the designated National Archives units (see 7.1.).

For transmittal to records storage facilities:

- a. group material of similar form;
- b. prepare an itemized list of contents; and
- c. pack in a suitable manner for transmittal.

Precautions should be taken to insure against loss, damage or abuse. For transmittal procedures to the Archives Branch, consult Records Management guidelines and the appropriate archives unit.



*Surveying to Record Topographic Elevations*

## 6.2 ARCHITECTURAL AND ENGINEERING SERVICES (ENVIRONMENT CANADA), HEADQUARTERS

The A&ES headquarters unit is in the process of developing a pilot, central index and referencing service for all records held by A&ES document centres. It intends to provide procedural directives regarding use and safekeeping of technical drawings and related records. These directives will be prepared in co-operation with regional units, Records Management staff and the National Archives.

## 7.0 INFORMATION CENTRES

### 7.1 ARCHIVES CENTRES

The National Archives operates two distinct types of facilities for information storage. The Records Management Branch operates eight Records Centres across Canada. These facilities are for dormant and closed active records from government departments. The Archives Branch operates special collections for special types of records in addition to the Federal Archives Collection for files and other common types of documents. These collections provide permanent storage and safekeeping of historical records no longer required by departments. At present, the Archives Branch services are not provided in the Regions.

National Archives Records Centres are located at:

- a. **Vancouver**  
2751 Production Way  
Lake City Industrial Park  
Burnaby, BC  
V5A 3G7  
(604) 666-6539
- b. **Edmonton**  
8707-51 Avenue  
Edmonton, AB  
T6E 5H1  
(403) 495-3120
- c. **Winnipeg**  
201 Weston Street  
Winnipeg, MB  
R3E 3H4  
(204) 983-8845

- d. **Toronto**  
190 Carrier Drive  
Rexdale, ON  
M9W 5R1  
(416) 675-2546
- e. **Ottawa**  
Building #15  
Tunney's Pasture  
Goldenrod St.  
Ottawa, ON  
K1A 0N3  
(613) 954-4175
- f. **Montréal**  
655A Montée de Liesse  
St. Laurent, PQ  
H4T 1P5  
(514) 283-4044
- g. **Quebec City**  
75 de Hambourg  
St. Augustin, PQ  
G3A 1S6  
(514) 283-4044
- h. **Halifax**  
Burnside Industrial Park  
131 Thornhill Drive  
P.O. Box 529  
Dartmouth, NS  
B3B 1S2  
(902) 426-4984
- i. **Director's Office**  
6th floor, Fontaine Bldg.  
200 Sacre Coeur Blvd.  
Mailing Address:  
395 Wellington St.  
Ottawa, ON  
K1A 0N3  
(819) 953-5715

The Archives Branch is located at 395 Wellington St., Ottawa, ON K1A 0N3. Most important technical information would eventually be transmitted to one of the three following collections:

- a. National Photography Collection
- b. National Map Collection: Government Cartographical and Architectural Records Section
- c. Federal Government Archives Collection.

## 7.2 CPS TECHNICAL INFORMATION CENTRES

In addition to CPS information centres maintained at program headquarters, every region has at least one central collection of technical information which contains dossiers of data on historic resources.

Headquarters' information related to the architectural, engineering and site analysis is maintained in the A&ES (HQ) Technical Records Centre, Equipment and Records Section, Buildings and Services Division. The Centre provides special storage for drawings, photographic negatives and reports. The Centre also co-ordinates arrangements with National Archives Records Centres. Each region should have a Technical Records Centre to provide a similar service.

Additional active operational information and files are kept by the individual staff conducting the analysis or with the CPS Records Office.

*Illustrations are the property of the Heritage Conservation Program, unless otherwise noted.*



# **VOLUME I**

# **PROJECT MANAGEMENT**

## **4**

## **PROTECTION OF HISTORIC FABRIC**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
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ORIGINAL DRAFT: A. POWTER AND J.S. SMITH



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### 5.0 REFERENCES

## 1.0 INTRODUCTION

This section outlines procedures and precautions designed to minimize the risk of damage to historic (or period) fabric during the investigation, design and implementation phases of the conservation process, and to prevent a gradual or sudden deterioration of on-site resources.

### 1.1 SCOPE AND APPLICATION

The recommendations made in this section apply to all Canadian Parks Service (CPS) staff and to all outside consultants and contractors engaged in the physical investigation, modification and maintenance of historic sites and structures.

All procedures outlined in this section should be read in conjunction with National Historic Sites Management Directives 3.8.3 "Preservation of Historic Structures" and 3.3.1 "Protection of Archaeological Resources."

## 2.0 DANGERS OF INADEQUATE PROTECTION

Damage to historic fabric can generally be attributed to a lack of adequate direction and supervision or of strict safety and security procedures. Actual damage can be categorized as follows:

- a. total loss of fabric due to fire, structural collapse, careless storage or deliberate removal and disposal;
- b. distortion of fabric due to structural deformation, environmental damage, mechanical abrasion or excessive investigative probing; or
- c. separation of fabric from context due to partial structural collapse, deliberate investigative stripping or preconstruction alterations and removals.

The consequence of such damage is an immediate loss of historic or period evidence and of architectural and structural integrity. Unless adequately controlled, such loss can limit the scope and accuracy of final design investigations, compromise the conservation design options and downgrade overall quality and future research potential of the historic site or structure.

## 3.0 PROTECTION OF FABRIC DURING PRECONSTRUCTION REMOVALS AND INVESTIGATIVE STRIPPING

All fabric in situ is considered to have potential historic significance and should be kept in place until otherwise specified by the project manager in consultation with the project team.

Investigative techniques, preservative treatments and adaptive modification designs that avoid removing or relocating existing fabric should always be considered first.

### 3.1 APPROVALS

Where the selective removal or stripping of materials is deemed essential, justify proposals to the project team and secure approval.

Consider all approvals subject to modification if new or unsuspected evidence is discovered during implementation. In such cases, the project manager, in consultation with the project team, should re-evaluate the course of action.

### 3.2 SUPERVISION

The removal or stripping of materials should always be supervised and controlled by the project architect or engineer or another individual designated by the project manager.

### 3.3 IMPLEMENTATION

Document any removal or stripping of materials. Ensure that the as-found status of the site or structure has been adequately recorded before preconstruction activity begins. As the work proceeds, have all new evidence recorded and reviewed by the architect or engineer for design verification and, if necessary, for any changes to the removal or stripping scheme.

As part of the recording, take samples of those building materials or other elements which are to be discarded. The samples should be clearly labeled, cross-referenced to photographs and record drawings and retained in a components collection.

Note: Do not reincorporate discarded elements elsewhere into the structure or use them for another purpose such as bracing.

For elements to be reinstated, record each in situ and then label it during removal. The label should include a description of the element, its original location orientation, date and name of the



*Bigg's Blacksmith Shop, Dawson, YT*

architect or engineer. Then carefully store the element in a safe, dry place away from all construction areas, preferably within the structure from which it was taken.

## 4.0 PROTECTION OF FABRIC IN SITU

### 4.1 GENERAL RECOMMENDATIONS

Fabric to be preserved in situ remains as a relatively fragile, complex physical record of the site's history. It must have continuous protection from accidental or deliberate damage or disfigurement.

The project team and the project manager should recognize the vulnerability of a historic site and its components to damage or deterioration during site development. Control and contingency plans should be drawn up before site work begins. Responsibility for the enforcement of these plans should be clearly delegated and their application monitored and evaluated.

### 4.2 SUPERVISION OF SITE ACTIVITY

The project manager, in consultation with the project team, should assess all proposed site activity for potential danger to the fabric.

The manager should delegate responsibility supervision and control of site activity to a team member or any other individual who is capable of both assessing the risk of physical damage

during project implementation and modifying original terms of reference, if necessary.

### 4.3 PROTECTION DURING PRECONSTRUCTION AND CONSTRUCTION

Avoid all forms of water penetration into the historic structure. Prepare temporary barriers beforehand if roofing materials are to be removed or exterior wall openings of any kind are to be created. A more permanent enclosure may be required for extended projects.

#### 4.3.1 Temporary Shielding

Use temporary shields of rigid or impact-absorbing materials to safeguard exposed fabric in construction areas. To avoid damage from fasteners, these shields should be supported and braced independently of the fabric.

Use impermeable membranes to protect absorbent materials from dust and moisture. Take care, however, to ensure adequate ventilation of the enclosed fabric if the barriers are to remain for an extended period.

Ensure that material placed against historic finishes will not cause physical abrasion or chemical decomposition. Many historic paints and wallpapers, especially on ceilings, have been damaged by temporary structural bracing using pads that are too rigid or that have resilient materials that are not sufficiently inert.



Rideau Chapel, National Gallery, Ottawa, ON

#### 4.3.2 Storage of New Materials

Do not store new materials within a historic structure or site if other suitable areas are available. In addition to the possibility of their causing physical damage from abrasion, concentrated loads can result in structural deformation.

Store all flammable or corrosive materials well away from the historic resources.

#### 4.3.3 Equipment Selection and Operation

Open-flame tools and equipment should be excluded from historic sites when possible. Alternative procedures should be specified or the work done off-site. Where open-flame tools and equipment must be used, have strict safety and emergency measures prepared ahead of time and approved by the responsible officer.

Power tools and machinery should be regulated in their use by the responsible officer in accordance with the condition and delicacy of the fabric and the possibility of structural, mechanical or visible damage.

Surviving on-site electrical circuits should not be used during construction unless appropriate testing has determined the adequacy and reliability of the electrical system and the circuits are to be used only for lighting or other low-amperage requirements.

Surviving plumbing, heating and other older mechanical systems should not be used unless adequate investigation reveals that there is no danger of water leakage, circuit overloading or the like.

#### 4.3.4 Fire Safety Controls

To ensure fire safety, all construction must be carried out in accordance with the Canada Labour Code and subordinate regulations, as well interim guidelines including FCC 301. In many cases, additional controls will be required due to the inherent flammability and value of much of the historic fabric.

#### 4.3.5 Vandalism Controls

The responsible officer should establish and review antivandalism measures before construction begins.

Consider temporary security barriers for all exterior openings and protective storage for easily detachable architectural and structural elements. Site access should be adequately controlled.

## 5.0 REFERENCES

**Fire Commissioner of Canada.** 1982. FCC 301, "Standard for Construction Operations." In: Fire Protection Engineering Standards. Ottawa, ON.

**Parks Canada.** 1971. Management Directive 3.8.3 "Preservation of Historic Structures." In: Vol. 3, National Historic Parks and Sites Management Directives. Parks Canada Directives Series.

**Parks Canada.** 1977. National Historic Sites Management Directive 3.3.1, "Protection of Archaeological Resources." In: Vol. 3, National Historic Parks and Sites Management Directives. Parks Canada Directives Series.

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# **VOLUME I**

# **PROJECT MANAGEMENT**

## **5**

## **PERSONNEL HEALTH AND SAFETY**

PRODUCED BY:  
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ORIGINAL DRAFT: COMMONWEALTH HISTORIC RESOURCE MANAGEMENT LIMITED

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## 1.0 INTRODUCTION

The undertaking of architectural conservation projects necessarily involves situations which are potentially hazardous to the health and safety of project personnel and visitors to the site. "Health" refers here to threats of an internal medical nature, including bacteria and viruses. It includes site hygiene, but that aspect is not discussed in this manual.



*Leather Safety Gloves*

"Safety" refers to physical dangers such as abrasions and falls. Some of these threats are common to all construction-related projects, such as the dangers of climbing on scaffolding or using power tools or working in poorly ventilated spaces. Others are related more specifically to conservation work, such as the use of brick-cleaning or poisonous chemicals or the investigation of a site which is contaminated with bird droppings. This article discusses both general and conservation-specific hazards, but is concerned primarily with the latter. Non-conservation-specific hazards are alluded to only briefly and the reader is referred to the texts cited in the bibliography for more detailed discussions of them. Conservation-related issues are treated here in greater detail.

This article is organized according to the sequence of the conservation project. Its five sections discuss:

- General Precautions
- Safety During Analysis
- Safety During Design and Development
- Safety During Operation and Interpretation
- Legal Issues

These matters are all considered here because they are primarily issues of project management.

### 1.1 GENERAL PRECAUTIONS

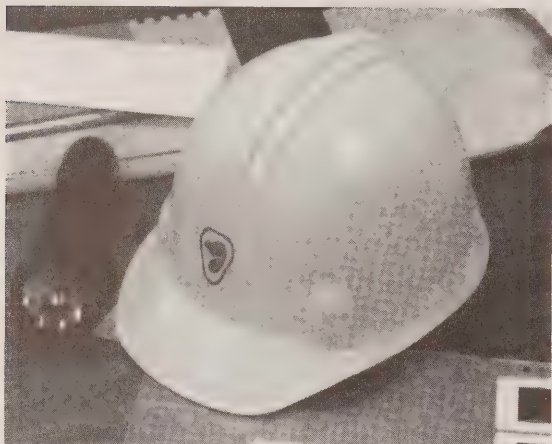
Safety depends on common sense, training and experience. Carelessness and laziness are often cited as the causes of accidents. The most basic precautions to be taken by personnel, such as not standing on or beneath unstable building components, respecting electrical hazards and keeping clear of vehicles are common-sense issues that are listed in general safety manuals and are not repeated here. The same holds true with precautions to be taken by management such as protecting sites from fire, collapse, vandalism and flooding. Some of these matters are also discussed in Vol. III. 4.1 "Architectural Analysis: General Assessment" and Vol. I.4 "Protection of Historic Fabric." Some general precautions which may not be so well appreciated are listed below.

#### 1.1.1 Back-up Safety

Whenever possible, ensure that personnel do not work on a site alone. Historic sites in particular often lend themselves to solitary analysis yet are fraught with hazards. (See 2.1). Personnel should always report their whereabouts and their estimated time of return to their managers or colleagues. Every remote site or every site on which people are working in small groups, should have a communications link with sources of help. A telephone is best and should be connected before work begins. Emergency numbers should be posted clearly. Provide radio communications in more remote locations requiring any inspection trips.

#### 1.1.2 Protective Clothing

Ensure that safety helmets and safety boots are always worn, even for short inspection visits. Extra helmets should be available when possible. Helmets and steel-reinforced boots are mandatory for coverage under Workers' Compensation or other insurance schemes.



*Protective Gear*

Leather gloves are advisable for most projects, especially those which involve carrying or moving objects. Rubber or plastic gloves should be worn when using corrosive materials or solvents. Face protection is advisable in the presence of certain hazards such as fungi, dust or flying objects or particles. (These are discussed further below.) No loose clothing, ties or rings may be worn near operating machinery and shirt sleeves must have tight wrist bands or be rolled tightly above the elbow. Long hair must be firmly tucked up in a hard hat. Safety glasses, hearing protection or face shields should be worn in machine shops (see 5.1).

### *1.1.3 Inoculations*

Tetanus or booster shots should be mandatory for all personnel on historic sites because of the presence of old and rusty metal. Other inoculations may be advisable for certain hazards.

### *1.1.4 Smoking*

Smoking is not permitted in any enclosed space owned or rented by the federal government. Smoking has never been allowed in national historic sites because of the fire hazard and the ruling may be extended to the surrounding area in consideration of the danger of dry grass or inflammable materials. Areas in which smoking is safe may be provided, but cigarettes should be stubbed out in sand. Fire extinguishers and or buckets of water should be provided.

### *1.1.5 First-Aid Kit*

Keep a first-aid kit in an accessible place on the site. Personnel should be trained in its use. Conduct regular checks to ensure the kit is kept fully stocked.

## **1.2 MANAGEMENT**

The staff developing or operating historic sites should appoint a safety representative or safety committee to co-ordinate and represent their health and safety concerns. This representation is mandatory under certain statutes (See 5.3).

## **2.0 SAFETY DURING ANALYSIS**

The analysis of historic sites poses numerous hazards to health and safety. Personnel should take careful precautions to minimize risks.

### **2.1 PHYSICAL HAZARDS**

Historic site analysis often involves moving through old buildings, vessels or environments that have not been properly maintained for prolonged periods. Many heritage resources are structurally unsound when acquired and contain a variety of dangerous conditions. Whenever personnel are traversing unfamiliar territory they must be particularly aware of the risks of physical injury. Determining the plan, structural system and condition before undertaking the investigation will reduce the risk of unpleasant surprises. Be sure to have adequate flashlights, lanterns or other sources of temporary lighting available.

#### *2.1.1 Unsafe Flooring, Stairs and Supports*

Flooring, stairs and supports may have deteriorated to the point that they cannot support the additional live load of a person or persons. Extreme caution must be taken. Determine the consequences of falling before venturing to step on a surface whose integrity is not known. Wear a safety belt or harness if appropriate. Horizontal surfaces are usually more stable close to the point of support (e.g. next to a wall or above a column). Unstable components may also come loose from vibrations caused by investigations and can fall on a person.





*Deteriorating Staircase – Possibly Unstable*

### 2.1.2 Unprotected Shafts

Access shafts, holes in floors, flues or raceways may not be readily visible and therefore pose a severe hazard.

### 2.1.3 Sharp Objects

Broken glass, protruding nails and other sharp objects can cause lacerations and punctures. If rusty or contaminated, they also pose a health hazard.

### 2.1.4 Electrical Hazards

Determine whether electrical power to the site has been shut off. If not, use extreme caution not to touch wires, other electrical components or objects in contact with uninsulated electrical power. Beware of broken wires. Electrical hazards are significantly intensified when surfaces are wet.

## 2.2 HEALTH HAZARDS

Historic sites often contain substances that may cause sickness, as distinct from risks of physical injury discussed in the previous section. Inhalation is the primary means of transmitting these substances, but contamination may also occur by contact and absorption.

### 2.2.1 Bird and Bat Droppings

#### a. Risks:

Buildings and soils are sometimes littered with the faeces of birds (most frequently pigeons) and bats, as well as with the corpses of those animals. The droppings may provide a growth medium for pathogenic fungi which cause two diseases: histoplasmosis and cryptococcosis. Histoplasmosis is a pulmonary infection that is particularly endemic in the St. Lawrence and Ottawa River valleys. Cryptococcosis can lead to meningitis. Precautions prescribed by some authorities include using a self-contained breathing device and wearing a complete suit of disposable clothing while working for extended periods in a (potentially) contaminated area. People with respiratory problems, those taking immunosuppressive drugs and those who suffer from diseases that make them particularly susceptible to fungi should not work in a suspect environment. Bearded men are at risk because breathing masks do not usually fit well. Chest X-rays, blood tests and other medical tests are advisable for persons who are exposed to droppings.

#### b. Decontamination:

Methods for decontamination have been developed for professional use, but they pose additional hazards to personnel and, in some cases, to the building fabric. A five percent Formalin solution (formaldehyde stabilized with methanol), buffered if necessary so that the acidic Formalin will not damage plaster, limestone and other alkaline materials, can be applied by spraying or scrubbing, but care must be taken not to use large quantities of water which may cause physical damage. Dry removal by placing the contaminated faeces in plastic bags and incinerating them should be done only under strictly supervised conditions. In all cases work closely with local health authorities when preparing and executing decontamination procedures.

#### c. Testing:

Procedures for testing samples for the presence of fungi are slow (often four to eight weeks to develop a culture) and testing facilities are not readily available. Responsibility for testing lies with the Medical Services Branch, Health and Welfare Canada.



### 2.2.2 *Mould and Mildew*

Other fungi are present in non-faecal mould, including mildew and rot often found in old buildings. It is believed that these can cause respiratory problems and they have been associated with tuberculosis and other diseases, although they normally are not as dangerous as droppings. Dust masks should be worn and the other precautions noted above should be observed if hazardous conditions are suspected.

### 2.2.3 *Animal Bites*

Abandoned structures are occasionally infested with animals or insects which bite. The most serious threat of disease is from rabies transmitted by bats, rodents or cats. Although the incidence of rabies is very low, bites should always be considered as potential rabies exposure. Immediately wash wounds and scratches thoroughly with soap and water. When possible, capture the animal for observation. In all instances of animal bites, medical help must be obtained. Bat colonies in roofs can be discouraged by constant illumination with artificial light.

### 2.2.4 *Other Communicable Diseases*

It is known that rabies and certain other communicable diseases can be transmitted by animal corpses. Avoid dead animals or handle with caution and wash thoroughly after contact.

### 2.2.5 *Gases*

Rotting material emitting gases, chemical action resulting from deterioration, accumulated hydrogen sulphide in sewers and silage gases all dilute or use up oxygen, creating a hazardous environment.

These conditions may be suspect in enclosed spaces such as fuel and storage tanks, sewers, lock gates and coffer dams. Tests should be made by qualified personnel to determine the nature and toxicity of the gases and whether they may cause an explosive atmosphere. Appropriate measures should be taken as a response.

### 2.2.6 *Hazardous Materials*

Materials used in construction or in subsequent alterations to a building may be hazardous. These include asbestos, ureaformaldehyde foam insulation (UFFI), highly toxic wood preservatives (some containing Dioxin) and lead-based paints. If architectural

plans and specifications are available, these should be studied to attempt to identify known toxic materials. If present, the materials should not be disturbed without determining the risks and taking special preventive measures.

### 2.2.7 *Radiography*

Radiographs (X-rays) are sometimes used for the non-destructive analysis and testing of historic materials. These should be used only by trained operators protected with radiation-measuring equipment and a lead-vinyl apron. Care must be taken not to expose other personnel to the X-rays. Although the radiation generated may be substantially dissipated in four metres of air, all safety precautions should be taken and persons near the radiation source should stand well behind the unit. Signs reading "radiation hazard" should be posted around the site in accordance with applicable regulations.

### 2.2.8 *Polychlorinated Biphenyls*

Polychlorinated biphenyls or "PCBs," are liquids formerly used as cooling agents in electrical transformers and capacitors required for power distribution in large buildings, mines and factories. Identified as dangerously toxic environmental contaminants, PCB production in North America was voluntarily suspended in 1972 and banned in 1977. However, electrical equipment manufactured before these dates may contain the substance, which poses a serious health hazard to personnel when periodic maintenance or replacement of equipment is required. Before service or removal of equipment which may contain PCBs, contact with the nearest office of the Environmental Protection Service, Environment Canada is recommended.

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## 3.0 SAFETY DURING DESIGN AND DEVELOPMENT

### 3.1 DESIGN FOR HEALTH AND SAFETY

Health and safety are important priorities in the design process.

#### 3.1.1 *Code Compliance*

Building and fire codes are prepared in an effort to make buildings safe from structural failure, fire or other emergencies. Most codes are written for new construction and certain code requirements are impracticable or even unreasonable when applied rigidly to the rehabilitation or restoration of older buildings and other load bearing structures. The strict enforcement of codes

may cause unacceptable conflicts with historical interpretation, such as prohibiting combustible finishes in certain public assembly uses or requiring that historically open staircases be enclosed. Recognizing this conflict between interpretation and protection has caused some code authorities to develop specific types of alternatives for use in renovating existing buildings.

Historic site architects and engineers must provide for an adequate level of safety in their designs, but may be guided by the principle of equivalences (also called compliance alternatives) which are embodied in the new renovation codes.

### 3.1.2 *Discouraging Animal Infestation*

Potentially hazardous pests can be discouraged by appropriate design. Pigeons are sometimes kept away successfully by devices such as spikes, nets and electrical cables, but such methods are acceptable only if they do not interfere with features of architectural interest. Bats are discouraged by illumination and ventilation. Chemical repellents, contraceptives, dehydrants and other methods are sometimes used, but the residues may pose toxic problems of their own. Do not implement solutions which create yet new safety problems or compromise the architectural-historical value of a building.

## 3.2 EXCAVATION AND DEMOLITION

The removal of hazardous materials, often necessary in the development process, may pose particular safety problems.

- a. **Bird Droppings:**  
Disturbing soil containing bird droppings may cause disease-bearing fungi to become airborne. (See 2.2.1)
- b. **Holes:**  
Removal of earth may expose previously buried cellars or wells and thereby create a physical hazard. Attempt to determine the location of all subterranean openings before excavation.

### 3.2.1 *Removal of Walls and Partitions*

Demolition raises dust and other particles which are subsequently inhaled. Some kinds of airborne dust, such as plaster from walls, are not believed to be toxic, but can cause internal abrasions and congestion. Excessive inhalation can be prevented by wearing a face mask.

Other materials are known to be hazardous. Asbestos, which may be used as an insulating material in walls or ceilings, as reinforcing fibre in plaster or may be used as an insulating material around pipes and ducts, is carcinogenic. It should be removed only if necessary and by specially trained and equipped personnel. UFFI is also hazardous. It should usually be removed. Ensure that all removal and disposal methods conform with environmental regulations.

The removal of paint by heat, scraping or the use of solvents poses hazards. These are discussed in 3.3.4, "Removal of Paint."

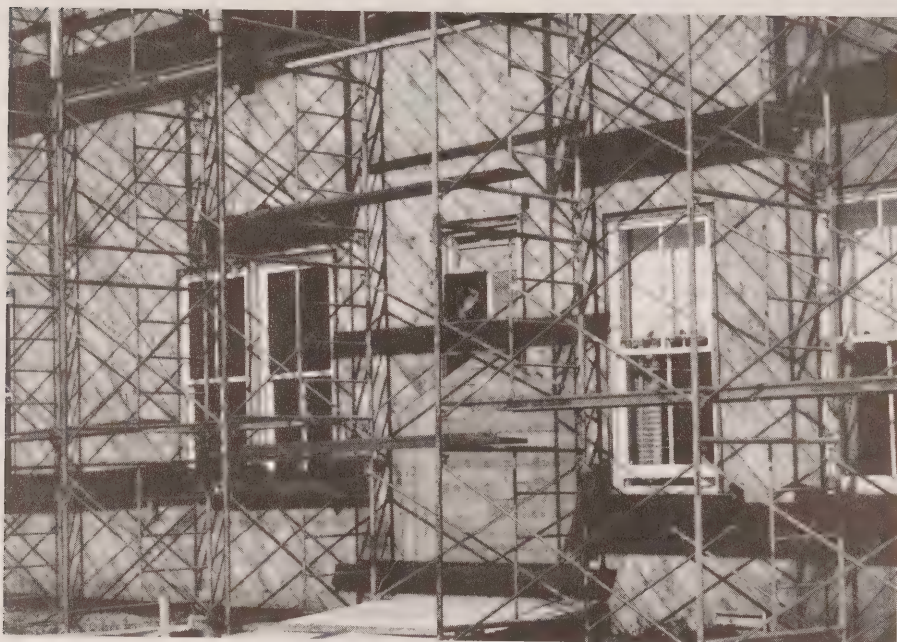
### 3.2.2 *Machinery*

The hazards of misusing power tools in demolition, such as jackhammers and chain saws, are well appreciated and need not be repeated here. The vibrations which they create may pose a special risk to historic sites, since they may cause cracking or even the collapse of extant building components. The vibrations can also affect personnel; they are known to cause Raynaud's phenomenon (an arterial disease) and tendonitis.

Power tools which cannot be controlled within close tolerances should not be used adjacent to historic fabric which is being conserved. Using them without adequate clearance may be dangerous to the operator. Use hand tools in these situations.

## 3.3 DEVELOPMENT

All work should follow construction safety guidelines and regulations issued by the Construction Safety Association and the Workers' Compensation Board. The construction process creates hazards that are specific to historic site development as well as hazards that are equally applicable to modern development.



*Self-supporting Scaffold*

### 3.3.1 Scaffolds and Ladders

Follow all regulations and design and installation specifications (CAN/CSA-S269.2-M87) which cover the use of ladders and scaffolds. Scaffolding is often rusty and so care should be taken when making the connections. In addition to the more well-known types of hazards associated with development, work on historic sites presents an additional problem: walls, bulkheads and other components may be unstable and so difficulties may be found in obtaining safe anchor points. An independent self-supporting scaffold is preferable, but it may be possible to brace a scaffold from appropriate points on the historic structure by passing the braces through window openings. Attachments to the historic fabric must not be allowed to cause damage. (This is discussed further in Vol. I.4 "Protection of Historic Fabric.") Determine that the wall is stable before leaning an extension ladder against it.

### 3.3.2 Fencing, Shoring and Railings

These provide protection to personnel, visitors and the building fabric. Follow current safety regulations when installing these types of devices.

### 3.3.3 Sanding and Milling Wood

These activities produce dust that can be harmful. Workers are subject to ailments such as asthma, rhinitis and mucosal irritations. The eyes and skin can also suffer irritation. Dust from Western and Canadian red cedar are reported to produce a greater risk of lung problems. The dust from redwood can cause sequiosis, which resembles pneumonia and can cause permanent lung scars.

### 3.3.4 Removal of Paint

#### a. Abrasive: Scraping or Sanding

Scraping layers of lead-based paints creates a fine lead-filled dust which can enter the lungs and cause lead poisoning. A face mask must be worn by all persons near the paint removal work when lead-based paints are encountered.

#### b. Thermal: Burning and Melting

Do not burn lead-based paint with a blow torch because the lead will vaporize and the fumes can be inhaled. The use of a torch is also a frequent cause of fires. Do not use



this process for painted wood. Extreme caution is required when using heat guns and other equipment using heat. Ensure that personnel wear proper masks.

c. **Paint Removers:**

Ensure that paint removers and solvents containing methylene chloride are avoided by workers with heart disorders. The fumes raise the carbon monoxide level in the blood, a potential cause of heart attacks. This in turn produces carboxyhaemoglobin, even after exposure has ceased. Other paint removers are flammable and create the risk of fire. Their fumes are heavier than air and fall to the floor or into basements, where they dissipate slowly and are easily ignited by sparks. Paint removers containing benzene are reported to be carcinogenic as well as flammable. They are also reported to cause specific diseases: aplastic anaemia and leukemia. Paint removers and solvents should be stored in spill-proof metal cans and off site from historic structures.

### 3.4 CLEANING, PRESERVATION AND INSECT CONTROL

Conservation projects use a variety of toxic and caustic materials, particularly as cleaners and preservatives, but also as fumigants, insecticides and for other purposes. They may be harmful through inhalation, ingestion, eye or skin contact or absorption. Some representative substances and their hazards can be cited.

As a universal precaution, it is essential that staff read Material Safety Data Sheets (MSDS) and all product labels and their precautionary notes carefully. Protective clothing should be worn where appropriate. Substances which should be applied only by skilled operators are not recommended for use by inexperienced in-house staff. See also Workplace Hazardous Material Information System (WHMIS) regulations.

#### 3.4.1 *Cleaning*

Building cleaning uses strong chemicals and solvents, most of which are dangerous if they come in contact with skin or tissue. Both acidic chemical cleaners (e.g. hydrofluoric acid) and alkaline chemical cleaners (e.g. caustic soda) can cause serious skin burns and blindness to operators or passers-by. Mechanical and abrasive methods (e.g. sandblasting, power brushes) create dust which is dangerous if inhaled. Silica dust can cause permanent lung damage. Steam cleaning is hazardous because of the high temperatures involved. Cleaning should

be done only by skilled professionals wearing protective clothing. Depending on pressure, water cleaning can be extremely hazardous to persons, as well as to the building fabric.

#### 3.4.2 *Preservatives*

A variety of substances is used for the preservation and consolidation of building materials. See, for example, Vol. IV.4.2 "Stabilization of Masonry Structures" and Vol. IV.4.3 "Stabilization of Wood Structures." Many are recently developed synthetic chemicals; some are dangerous while others are generally harmless. Risks include toxicity, fumes, skin burns, flammability and rapid adhesion (e.g. epoxies).

It is essential to read MSDS and the manufacturer's literature carefully for instructions as to safe application. In many cases protective clothing, adequate ventilation, face masks and or eye protectors may be required. Care must also be given to the safe disposal of all hazardous chemicals. EPA regulations regarding the disposal of hazardous materials should be consulted.



*Water Cleaning*

#### 3.4.3 *Insecticides and Fumigants*

Chemical insecticides and fumigants are sometimes used to control termites, other insects and fungal growths as a part of the preservation process. These substances are toxic to persons and animals as well as to insects. They can be harmful through ingestion, inhalation and absorption. Ensure that all users read MSDS and labels carefully and take appropriate precautions. Always keep containers out of the reach of children and away from

food. If insecticides come in contact with the skin, wash the affected area at once with soap and water. Medical aid should be sought in the event of any contact.

Care must be taken as to the safe disposal of insecticides. Use mechanical insecticides such as diatomaceous earth whenever possible. Avoid broad spectrum, highly toxic, chemical insecticides. These can disturb the predator-prey balance, causing greater problems than they solve.

### 3.5 VISITOR SAFETY

Historic sites are sometimes accessible and interpreted to the public during the development stage. If so, precautions must be taken to protect visitors from physical hazards. Construct railings and boardings where necessary. Signs should be posted warning of hazards. Ensure that all visitors are escorted by a member of staff and wear protective helmets. Visitors should not be allowed near areas in which dangerous processes are occurring. Investigate whether allowing visitors on the site may violate the conditions of Workers' Compensation or other safety programs. Arrangements to visit should be made in advance with the Project Manager.

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## 4.0 SAFETY DURING OPERATION AND INTERPRETATION

The completion of the development phase and the subsequent operation and maintenance of an historic site ushers in a new set of concerns for health and safety.

### 4.1 HISTORIC SITES

The safety of visitors to historic sites must be a primary consideration in operation.

#### 4.1.1 *Protection from Passive Hazards*

Construct and install permanent railings and fencing to protect visitors from hazards such as holes, drop-offs, unstable structures or areas with unsafe footing. Post signs to warn of any special hazards. Personnel should be stationed near any extraordinary hazards.

#### 4.1.2 *Cleaning and Maintenance*

Some materials used for cleaning and maintenance are toxic or flammable. Instruct maintenance personnel to read labels care-

fully and use products in accordance with the manufacturer's instructions. Cleaning may pose temporary hazards such as slippery floors. Ensure that visitor movement is restrained when these conditions exist.

#### 4.1.3 *Pest Control*

If pesticides are used to control insect or rodent infestation, care must be taken not to endanger the health of visitors, staff, pets or livestock. Follow the manufacturer's instructions closely and do not place the pesticides in a location where they might cause accidents.

Rodenticides cause dehydration of the rodents and often drive them to drains or other water points. Rodents dying in these locations can pollute water sources, as well as creating disposal problems.

#### 4.1.4 *Weed Control*

Avoid the use of herbicides in landscape maintenance. Use "turf management" practices such as top dressing and overseeding to maintain lawns and opt for manual weed removal. If herbicides must be used, follow the manufacturer's safety instructions. Post conspicuous signs warning visitors and staff of their use and leave the signs in place for not less than three days. Some jurisdictions have regulations with respect to spraying. Follow them.

#### 4.1.5 *Accidents*

All staff and volunteers should know what to do in the event of an emergency and should be encouraged to take first-aid training. Keep a first-aid kit on the site and make regular checks to ensure that it is fully stocked.

In the event of any serious injury to staff or visitors, including any eye injury, contact a physician at once. All accidents should be recorded in the accident book, including the identity of the injured person; the date, time and location of the accident; and the cause and the nature of the injury. Keep these records for at least three years. The scene of the accident should be left undisturbed until it is determined whether a full investigation will be required.

### 4.2 WORKING HISTORIC SITES

Historic sites in which period machinery is operated or demonstrated present particular safety hazards. This section suggests some of the precautions that may be taken in working historic sites. The guidelines provided in Section 4.1 remain applicable.



Period historic machinery should only be operated by qualified staff. Special training may be necessary or certain machinery may require an operating certificate issued by other regulatory agencies.

#### 4.2.1 *Staff Safety*

Staff and volunteers must ensure their own safety by wearing eye protection, ear protection, safety helmets or dust masks where appropriate. They should always wear protective footwear. Ensure that no loose items of clothing are worn near operating machinery. Machinery must not be operated while under the influence of certain medications or illegal drugs (see also 1.2).

#### 4.2.2 *Operating Manual*

Provide complete instructions on the use of all historic machinery and vehicles in the historic site's operating manual. Include detailed safety policies as applicable. The use of historic machinery often does not comply with contemporary factory and workplace safety regulations and so it is important to develop a close relationship with safety officials and interpreters who should participate in preparing the relevant sections of the operating manual.

#### 4.2.3 *Placement and Installation of Machinery*

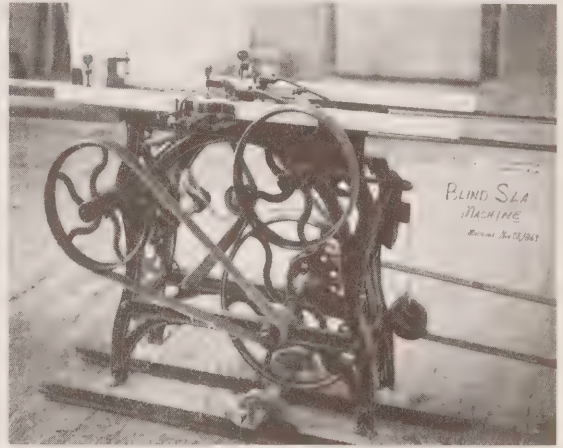
Precautions regarding site visitors must be taken. Retain all original guards on the machinery as well as those which were added during the working life of the machinery. Guards should always be in position when the machinery is in operation. Provide guards, rails or barriers to protect the operator and to keep visitors at a safe distance. These should be designed sympathetically and specifically for their purpose, using traditional materials where possible. If guards are removable they should be locked in position. Provide protection from belts in case of breakage.

Several operating sites may have old electrical transformers which contain PCBs. These should be reported to the appropriate authorities and scheduled for draining or removal and disposal in accordance with regulations. If PCBs are suspected, call in specially equipped personnel to test for this toxic substance. (See also 2.2.8).

#### 4.2.4 *Operating Procedure*

Train all operators and attendants in procedures for operation, visitor control, accidents and fire. All attendants should know how to stop the machinery and in what circumstances to do so.

Display starting procedures and prestarting checks for machinery. Ensure that these are followed. Machinery should be maintained regularly and its operation should be monitored during use for signs of potential failure. Take appropriate action in the event of a maintenance problem.



*Blind Slat Machine*

#### 4.2.5 *Ventilation*

Provide proper ventilation, particularly for operations which produce large quantities of dust and airborne particles (e.g. sawing wood, milling grain or weaving textiles). Provide proper exhaust ventilation for fumes and gases emitted from combustion engines. Face masks may be required in some situations, such as in gristmills.

### 4.3 WORKING AGRICULTURAL SITES

Working agricultural sites present particular concerns because of the livestock and the use of mobile farm machinery.

#### 4.3.1 *Livestock*

Animal husbandry requires special training and precautions. Ensure that staff and volunteers engaged with animal husbandry have proven experience in looking after livestock and are capable of acting responsibly and effectively should an emergency situation arise. All staff and volunteers must be immunized against tetanus and should be aware of the symptoms of common animal diseases. They should wear proper clothing, usually overalls and boots. The public should be warned by posted

notices and verbally that animals may be dangerous and a safe distance should be maintained. Smoking is strictly prohibited in and around farm buildings.

#### 4.3.2 Farm Machinery

Provide proper maintenance for tractors and other farm machinery. Always operate the machinery with extreme caution. The public should be kept at a safe distance. No passengers should be carried, unless proper seating is provided and other appropriate provisions are made. Safety chains should be used during all towing operations. All applicable requirements must be met if vehicles are to travel on public roads.

### 4.4 FOOD PRODUCTION

The production of food is sometimes undertaken in working farms or similar sites. Cheese, bread and flour are popular products. If the food is intended to be made available for sale or distribution, all applicable health laws and standards must be observed. The maintenance of the highest levels of sanitation is essential. Conflicts may arise between the needs of sanitation and those of interpretation; if so, the former must not be compromised.

#### 4.4.1 Food Preparation and Sales

The preparation of food and its distribution to visitors is a complicated matter. Follow all health regulations and practices pertaining to restaurant operation.

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## 5.0 LEGAL ISSUES

### 5.1 STATUTES AND REGULATIONS

All work on historic structures shall include protection for the public in accordance with the Canadian Construction Safety Code, 1975. Safety in the workplace is also regulated by additional federal and provincial health and safety statutes (the Canada Labour Code, Part IV, R.S.C. 1970, c. 2-1; and for example, in Ontario, the Occupational Health and Safety Act, R.S.O. 1980, c. 321 and associated regulations for construction projects and industrial establishments); and by provincial Workers' Compensation Laws (e.g. in Ontario, The Workers' Compensation Act, R.S.O. 1980, c. 539). Workers in the federal public service are also regulated by health and safety policies and guidelines established by the Treasury Board pursuant to Sec-

tion 7 of the Financial Administration Act and published as *Handbook of Occupational Health and Safety*. Additional regulations control the use of toxic substances. The safety of completed projects is regulated by building and fire codes, section 3.3.1.

### 5.2 PRINCIPLES

An employer is obliged under law to provide a safe place of employment as an implied term of the employment contract. An employer also has a duty to an employee to provide safe and proper equipment. The posting of disclaimers or warning notices does not absolve an employer from the responsibility for safety. However, the principles of the liability of an employer for injuries to a worker are of limited application in view of the Workers' Compensation laws, since the laws in some provinces deny employees the right of action against employers covered by the Act.

An employee generally has the right to refuse to work where he or she has reason to believe that a dangerous situation exists. The worker must report the situation to the employer and the safety representative or committee. An investigation follows. The employer cannot carry out reprisal against the employee.

### 5.3 SAFETY COMMITTEE

Some statutes provide for the establishment of health and safety representatives from among the workers and for the establishment of safety committees in larger organizations.

The safety representative(s) will evaluate policy on matters relating to health and safety and will pay attention to the provision and maintenance of safe techniques and systems and adequate training for staff and volunteers. In short, they will ensure the development and maintenance of a safe and healthy working environment. Safety representatives will ensure that the staff is familiar with the legislation under which they are working. Employers are obliged to record the use of chemical agents and toxic substances and the representatives should monitor regulations such as these.

### 5.4 INVESTIGATION

The statutes and guidelines provide for the investigation of accidents, injuries and complaints. Proper records should be maintained to facilitate investigations.

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# **VOLUME I**

# **PROJECT MANAGEMENT**

## **6**

## **USE OF CONSULTING SERVICES FOR CONSERVATION PROJECTS**

PRODUCED BY:  
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## 1.0 INTRODUCTION

The purpose of this section is to define the requirements of the terms of reference provided to the consultant for the execution of work concerning the conservation of historic sites and structures.

It provides a proposed contract procedure to ensure that commonly recognized and accepted practice is followed in these activities.

### 1.1 DEFINITION OF CONSULTANT

For the purpose of this section, a consultant may be a consulting engineer, architect, landscape architect, urban planner, conservation scientist, technician, surveyor or member of any other discipline associated with the management of historic sites.

For work requiring a professional seal, a consultant shall be an individual or a firm who, under an act of the provincial legislature, is properly registered or licensed to practice as a professional within the province in which the work is to be performed. When consultants are working where provincial legislation does not exist, the individual or firm shall be a certified member of the national professional association particular to his or her profession.

This section may also be used, with appropriate modification, for obtaining services such as heritage recording or technical research which might not involve professional responsibility in the usual legal sense.

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## 2.0 POLICY

According to Chapter 315, "Consulting and Professional Services" in the Treasury Board Administrative Policy Manual:

The decision to engage the services of a consultant shall take into account three general considerations:

- a. a services contract and its performance shall avoid establishing an employer-employee relationship between the Crown and the individuals performing under the contract.
- b. the contract for the required services shall not be used to circumvent person-year constraints.
- c. the contract shall not be for indeterminate work or for an indeterminate period [p. 5].

Further, the terms of reference will be:

- a. explicit as to the requirements of the client department and the responsibilities of the consultant so that questions of interpretation can be avoided; and
- b. prepared in sufficient detail to ensure that the client department is supplied with the advice or services that it requires but, at the same time, flexible enough to permit innovation and the exercise of initiative by the consultant in the interest of the client department [p. 7].

The contracting authority is responsible for including in the contract appropriate mechanisms to allow monitoring of the work, co-ordination with other related activities and re-direction of the work of the consultant, if necessary. The consultant is responsible for controlling the work under contract to achieve the required objectives within the time and budgetary constraints of the contract and for appropriate liability insurance coverage consistent with the general conditions of the contract.

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## 3.0 IDENTIFICATION OF CONSULTING SERVICES

A conservation project may require consulting services for the following:

- project planning
- research and data collection
- classification and storage
- topographical surveys and landscape inventories
- feasibility studies
- field recording and investigation
- technical analysis
- concept alternatives
- drawings, specifications and tender documents
- project management
- construction supervision
- identification of special materials, methods of assembly and craft skills
- as-built documents
- maintenance programs
- long-range planning and resource allocation and
- specialized testing services

A consultant may, according to the nature of the work, be engaged for all or part of a conservation project.

There may also be a variety of consultants engaged at one time or responsible for different aspects of the work. In either case due consideration should be given in the terms of reference to the need for continuity and co-ordination where one job is directly consequent upon another.

The consultant's mandate concludes with completion of the work on the date specified in the contract.

Occasionally, an outside consultant can become part of the project team, in order to ensure a high level of co-ordination. This is usually a preferred option, but the time commitments and additional work, if required, should be agreed upon by both parties and authorized by an official change order attached to the original contract.

#### 4.0 TERMS OF REFERENCE

Terms of reference for consulting services, prepared by the officer responsible for the execution of a conservation project, provide the contractual basis upon which the consultant's work is established (see sample in Appendix). The terms of reference are provided to the consultant as a basis for his or her submission.

The terms of reference may include, but are not necessarily confined to, the following:

- a. a background statement outlining the situation leading to the requirement;
- b. the objective – a statement describing that which is to be achieved;
- c. the definition and the scope – a description of the range, extent and bounds of the work;
- d. special instruction;
- e. details of any constraint imposed, such as government policies and standards, current and proposed related activities, sensitivity to other interests, protection of the environment, conservation of resources and other relevant restrictions;
- f. details of available client support and client responsibilities;
- g. availability of relevant existing documents;
- h. the manner in which work documents shall be presented;
- i. a schedule for the completion of each stage of the work and for the entire work;
- j. the sequence in which work stages are to be undertaken;
- k. financial limitations of the project budget and break-

down within which the work shall be performed;

- l. progress report requirements and other control procedures to be applied by the client agency during the work;
- m. approval and acceptance requirements relating to performance of the several stages and of the work as a whole; and
- n. basis of payment. [adapted from Treasury Board of Canada Manual Ch. 315, p. 19].

The effectiveness of the consultant's work will be profoundly influenced by the precision and reliability of the information provided.

#### 4.1 BASIS OF PAYMENT

Mention of remuneration in the terms of reference should be limited to identifying allowable expenditures for the work described and the mode of payment. This should include a description of travel costs and disbursements imposed by the nature of the project, which may be reimbursed in accordance with the current Treasury Board Travel Directive.

Detailed definitions of conditions of remuneration, including penalties, should be contained in the contract for performance of work to which the terms of reference are attached.

The officer responsible for preparing the contract should be consulted before the terms of reference are completed.

#### 4.2 HAZARDOUS CONDITIONS

Hazardous conditions such as unsafe buildings or structures requiring particular safety precautions should be described in the terms of reference.

#### 5.0 IDENTIFYING POTENTIAL CONSULTANTS

While developing the terms of reference, the responsible office should consider whether properly qualified consultants are available to carry out the work as specified.

As a general principle, professionals in the contemporary field should not be considered for work on designated historic properties, unless they have additional training and experience.

In some cases, consideration may be limited to members of organizations such as ICOMOS Canada, the International Insti-



tute for Conservation - Canadian Group (IIC - CG) or the Association of Heritage Consultants (AHC), which have specific principles and codes of ethics for their members with respect to historic resource conservation.



*Hazardous Conditions*

## 5.1 SCREENING CRITERIA

Four criteria often used in the consultant selection process are knowledge, experience, availability and cost.

Cost is sometimes dealt with separately and may be a consideration only if a number of consultants appear to be otherwise of equal quality. In some cases, a cost figure is set as part of the budgeting process and consultants are advised of the approximate magnitude of funds available.

The other three criteria are interrelated.

### 5.1.1 Knowledge

Knowledge of conservation theory and practice is gained either through formal training programs or through apprenticeship within an established conservation organization or private practice.

Formal training is still relatively scarce within Canada, but undergraduate and graduate courses are becoming available in a number of professional schools. Increasing numbers of Canadians have graduate degrees in conservation from established foreign programs.

Other consultants have developed their knowledge through apprenticeship within provincial heritage agencies, the Canadian Parks Service (CPS) and other organizations with recognized expertise.

Appropriate knowledge is a prerequisite for consideration as a consultant.

### 5.1.2 Experience

Experience has to be measured in relation to the specific tasks required.

Many design professionals have worked on existing properties, but relatively few have worked closely with historians, archaeologists, conservators and others normally involved in full programs of conservation and restoration. In some cases, experience is needed with sites dating from a particular time period or involving certain materials or methods of assembly. Other cases may demand project management experience or familiarity with certain field procedures.

The range of desirable experience should be defined as the Terms of Reference are being developed.

### 5.1.3 Availability

Availability is a relevant question for larger firms, where there are a number of specialists of whom one or two are particularly important to the success of a project. With smaller firms or individuals, the ability to complete the work within the required time frame is a relevant issue. Occasionally, when expertise is difficult to obtain, a project schedule may have to be adjusted to deal with a problem of availability.

## 5.2 LOCATING QUALIFIED CANDIDATES

There are relatively few consultants in the conservation field. Proposals may have to be invited from firms or individuals across the country or even from outside Canada. The Association for Preservation Technology, the most important North American organization for information exchange in the conservation field, maintains a directory of APT members and their areas of expertise. This directory may be useful in identifying contacts. Other sources of assistance are the various regions and headquarters offices within CPS and the offices of ICOMOS Canada, the IIC-CG, the AHTC, Heritage Canada and the various provincial heritage agencies.

If only one qualified consultant can be found for a specific task, a justification of sole source must be prepared and attached to the request for contract.

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## 6.0 CONTRACT FILE

The entire contract file should be made up of the following documents:

- a. Internal Circulation
  - request for contract
- b. Contract Documents
  - contract for performance of work
  - general conditions
  - terms of reference
- c. Supporting Documents
  - conservation brief
  - surveys and technical reports

- historical reference
- photographs and records
- departmental standards and regulations
- others appropriate to the project

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## 7.0 APPROVAL

The terms of reference, terms of agreement and supporting documents constitute a legal obligation binding the Department and consultant. According to Departmental regulations, they require formal approval for signature by the authorized representative of both parties.

---

## 8.0 PROPOSED CONTRACT PROCEDURE

The following procedure is suggested for the completion of the contract file:

- a. complete terms of reference for consulting services;
- b. confirm availability of sufficient funds and establish contract;
- c. confirm or establish contract post;
- d. confirm approval of responsible officer;
- e. complete request for contract form and submit to contract administrator;
- f. compile contract form, general conditions, terms of reference and supporting documents for signature and file; and
- g. submit the complete file for final approval and transmittal to the consultant.

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## 9.0 REFERENCE

Treasury Board of Canada. September, 1980. Chapter 315, "Consulting and Professional Services." In: Administrative Policy Manual.

## 10.0 APPENDIX: PROPOSED TERMS OF REFERENCE FOR CONSULTING SERVICES

DEPARTMENT OF ENVIRONMENT  
CANADIAN PARKS SERVICE

Identify responsible office

PROJECT IDENTIFICATION \_\_\_\_\_

LOCATION \_\_\_\_\_

PROJECT NO. \_\_\_\_\_ DATE \_\_\_\_\_

### TERMS OF REFERENCE FOR CONSULTING SERVICES

#### 10.1 OBJECTIVE AND SCOPE

Describe briefly the whole project, the purpose of this work and the final results expected by the Department.

Describe precisely the work expected from the consultant.

Suggested headings:

- General
- Work included
- Work excluded

Number each item of work described.

#### 10.2 TIMING

##### a. Partial Completion Dates

Summarize the dates to be met in completing the project according to appropriate stages of production.

Include periods during which the responsible office will review and comment on the work performed.

##### b. Presentation Dates

Give dates or stages at which review is required (for example, preliminary, 50 percent, 90 percent).

Give time allocated for review by the responsible office.

##### c. Final Completion Date

Give date subsequent to final presentation for contract completion.

#### 10.3 PLANNING

- a. Within two weeks following award of this contract, the consultant shall submit a detailed work program and work calendar for approval by the director. This calendar, when approved, shall be respected during the course of the work.
- b. As appropriate to the execution of the work, the consultant shall hold periodic meetings at the office of the consultant or of the Department. These meetings shall be described in the work calendar. Further meetings may be held on any other mutually convenient date at the request of the director or of the consultant.
- c. At such meetings, the consultant will present a list of technical problems, solutions to which depend on the responsible office and which prevent the consultant from meeting deadlines.
- d. Minutes of each meeting shall be recorded by the consultant and shall be transmitted to the director within four days of the date of the meeting.
- e. A monthly work progress report shall be submitted by the consultant. Periodic meetings shall be co-ordinated to coincide with receipt of the work progress report by the responsible office.

#### 10.4 PRESENTATION OF DOCUMENTS

- a. All plans and drawings shall be produced on standard drawings sheets provided by the Department.
- b. All plans, drawings and reports shall conform to departmental and national standards appropriate to each discipline.
- c. All interim or final reports, plans, specifications and so on, shall be submitted in two copies [modify quantity as appropriate].
- d. One additional set of all final documents shall be provided on first-class material suitable for reproduction:
  - Drawings, diagrams and maps: polyester film, mat surface, reverse print or original.
  - Printed matter: bond paper suitable for dry copying; format 21.5 x 28.0 cm [modify format as appropriate]. For certain services, this paragraph may not be required.

- e. Two proof copies of all photographs shall be provided, suitably indexed, mounted and bound in 2.5 x 28 cm format.
- f. The original negative or slide shall be provided for all photographs and shall accompany one set of photo proofs.

#### 10.4.1 Professional Seal

To all drawings, reports and research documents prepared in the course of this project, the consultant shall attach his or her professional seal and or signature.

[For certain services, this paragraph may not be required.]

#### 10.4.2 Copyright

- a. All field reports, research documents and other research material obtained from the Department or prepared in the course of this work shall be transmitted to the Department.
- b. All reports, drawings and specifications, photographs and other documents prepared in connection with this work shall become the property of the Department with full copyright vested in Her Majesty.
- c. The consultant shall not use, or allow the use, of any documents related to this work for purposes other than those described, except upon prior written consent of the Department.
- d. Original documents retained by the consultant shall be held in trust and shall be transmitted to the Department within two years from the date of conclusion of the contract. Remuneration for duplicate polyester copies to be retained by the consultant shall be paid by the Department.

#### 10.4.3 Approval

- a. The consultant will, at all times, abide by the recommendations formulated by the responsible office.
- b. The consultant will, on the basis of interim approvals, proceed with the work of his or her contract.
- c. The consultant will complete all necessary documentation to finalize the contract.

#### 10.4.4 Contract Amendments

- a. The consultant is committed to the concept and budget approved by the responsible office. Failure to follow directives can result in contract termination.
- b. When there is a need for changes in the work, the consultant will recommend amendment action.
- c. The responsible office will review recommendations of amendment action and within \_\_\_\_\_ days [specify number of days] will prepare submissions to higher authority for approval of requested contract amendments, including monitoring progress, expediting, co-ordinating queries and so on.
- d. The responsible office will prepare authorized contract amendments ensuring contractual compatibility and distribution of amendments to the consultant and other parties concerned.
- e. The responsible office will refer serious and protracted disputes to senior management.

### 10.5 LANGUAGE REQUIREMENTS

- a. All reports, drawings, specifications and other documents related to this work shall be presented in \_\_\_\_\_ [specify the language required].
- b. All correspondence related to this project shall be conducted in \_\_\_\_\_ [specify the language required].
- c. All meetings related to this project shall be conducted in \_\_\_\_\_ [specify the language required].

### 10.6 PERSONNEL

The consultant shall submit to the Department:

- a. The names, roles, responsibilities, qualifications and experience of all the members of his or her staff who will be employed for this work;
- b. The names of all the subconsultants who may be required to carry out the work;



- c. The work plan for members of his or her staff to accomplish duties related to the contract; and
- d. The consultant will request from the subconsultants the same information as requested of him or her by the Department under the terms of his or her engagement.

## 10.7 BUILDING STANDARDS

- a. General  
The consultant shall adhere to applicable Canadian standards executed according to the consultant's plans, shall meet the requirements of the applicable codes and shall have the approval of the competent authorities.
- b. Drawing Scales  
Scales used on drawings shall be to CSA recommended standards.  
Specific scales required shall be \_\_\_\_\_ [complete as appropriate to the project].

## 10.8 HISTORIC CHARACTER OF STRUCTURES AND SITE

Modify the following sections as appropriate, if the site is not a national historic site.

- a. This is a national historic site \_\_\_\_\_ [specify site].  
The consultant shall observe all policies and regulations concerning such sites.
- b. All buildings, structures, plant materials, land forms, cairns, plaques and other features of the site shall be treated as historic monuments.
- c. Any object or artifact found during the execution of this contract will remain the property of the Department. The responsible officer shall be notified of any such finds before they are removed or disturbed so that proper steps may be taken to preserve and record the object and its location.
- d. The following precautions shall be observed to protect historic material from damage:
  - testing or sounding of structure and materials shall be done by non-destructive methods

- investigation by removal materials shall be done only upon written approval by the Director and shall be fully recorded.
- no open-flame tools shall be permitted on the site. See Vol. I.4 for more information.

## 10.9 COST ESTIMATES

Classes of cost estimates referred to in this document shall be interpreted as follows:

- a. Class "A":  
A detailed estimate based on updated unit prices and quantity take-off from final drawings and specifications. It is used to evaluate tenders or as a basis of cost control on day-labour construction.
- b. Class "B":  
An estimate prepared after any minor refinements to the user requirements have been made in the project brief, detailed site investigations and studies have been completed and the preliminary or conceptual design has been established in a design brief. It is the minimal class of estimate required for obtaining effective approvals (that is, to proceed to construction).
- c. Class "C":  
An estimate prepared when the user requirements and scope of the project are known, when the studies and investigations have been substantially completed and the project brief has been prepared. It is used for preliminary approval (that is, authority to spend specific funds on predesign and design to obtain a Class "B" estimate). At this stage, the design cost portion of the total estimated cost should be a Class "B" estimate.
- d. Class "D":  
Preliminary or conceptual estimating indicating the magnitude of a proposed project prepared by a comparison with similar facilities. It is developed after options analysis and is used to obtain project definition approval (that is, to proceed with studies and investigations sufficient to develop a Class "C" estimate).

Note: A Class "D" estimate should not be raised to a Class "C" or "B" estimate by the application of risks.

## 10.10 SPECIAL CONDITIONS

## Supporting Documents

- a. List all documents available to the consultant in support of his or her work; particular reference should be made to existing documentation, either historic or contemporary, which will enhance the consultant's effectiveness and to departmental procedures which must be respected by the consultant.

## Hazardous Conditions

- b. The following hazardous conditions have been observed and are drawn to the attention of the consultant. Further hazards observed shall be identified by the consultant and notification given to the Department. Due care shall be taken with respect to all such conditions.

[List all hazardous conditions. See Vol. I.5 for a summary of hazards most commonly associated with historic sites.]

## Liability Insurance

- c. The consultant shall carry professional and public liability insurance appropriate to the nature of the work. Proof of coverage shall be provided to the Department upon written request.

## Conflict of Interest

- d. The consultant will state that he or she has no pecuniary interest in the business of any third party that would affect his or her objectivity in carrying out the contract.

## Owner's Representative

- e. For the purpose of this contract, the signing officer for the Department shall be:

Name \_\_\_\_\_  
 Position \_\_\_\_\_  
 Address \_\_\_\_\_  
 Telephone \_\_\_\_\_

For the purpose of this contract the Responsible Officer for this project shall be:

Name \_\_\_\_\_  
 Position \_\_\_\_\_  
 Address \_\_\_\_\_  
 Telephone \_\_\_\_\_

[Complete as appropriate.]

## Consultant's Representatives

- f. For the purpose of this contract, the representative of the consultant shall be:

Name \_\_\_\_\_  
 Position \_\_\_\_\_  
 Address \_\_\_\_\_  
 Telephone \_\_\_\_\_

[Complete as appropriate.]

## Correspondence

- g. All correspondence to the Department, including invoices, shall be addressed as follows: \_\_\_\_\_

[Complete as appropriate, giving the full address of the responsible branch and the name of the officer to whose attention correspondence should be sent.]

## 10.11 BASIS OF PAYMENT

- a. Payment for consulting services shall be on the basis of \_\_\_\_\_ [specify cost-plus, percentage, per diem rates or other, as appropriate] in accordance with the regulations of \_\_\_\_\_ [identify the appropriate professional corporation and describe exceptions if required].
- b. The maximum allowable expenditure and allowable expenses for this contract shall be defined in the terms of the contract, based upon a reasonable assessment of the scope of the work. This amount shall not be exceeded without prior approval of the Director and subsequent issue of an official change order.
- c. Payment shall be made in accordance with the stages of the work or upon a monthly basis according to the terms of agreement and upon submission of accounts.

*Illustrations are the property of the Heritage Conservation Program, unless otherwise noted.*









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# ARCHITECTURAL CONSERVATION TECHNOLOGY

## VOLUME II HERITAGE RECORDING

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
OTTAWA



Canadian Heritage  
Parks Canada

Patrimoine canadien  
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# **ARCHITECTURAL CONSERVATION TECHNOLOGY**

## **VOLUME II HERITAGE RECORDING**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
OTTAWA



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**NOTE:** Since this manual was in production when federal government departments were restructured in 1993, it was impossible to update all in-text government references. The Canadian Parks Services (CPS) of Environment Canada is now Parks Canada of the Department of Canadian Heritage, and Public Works is now part of the Department of Government Services.

**I**ncluded within the seven volumes of the ACT manual is both basic and specialized information on architecture, engineering and landscape works.

References at all levels within these disciplines, useful both in practice and in training, are intended to:

- introduce and familiarize the user with conservation concerns;
- serve as an "aide-mémoire" at both the design and managerial levels; and
- provide guidance to professional consultants responsible for recording and analysing historic structures, and applying recommended conservation methods to their protection and preservation.

All procedures outlined in these publications should be read in conjunction with the reference material, manufacturer's literature and the relevant Canadian Parks Service – National Historic Sites Management Directives.

In all matters where detailed specifications are required, such as building codes, fire regulations and the use of chemicals, the prevailing and local references and regulations must be consulted and applied.

**P**lease note that the ACT manual has been prepared within the context of Parks Canada Policy (1979). The newly proposed Canadian Parks Service Policy (1990) establishes additional and broader directions that, however, do not alter the orientation of the technical material covered. The ACT manual reflects the well established principles of conservation as defined by national and international charters and conventions – see Vol. I Appendix.

Within the proposed policy, the Cultural Resource Management (CRM) section (see Vol. I, Appendix 5.17) establishes the overall framework for the conservation and presentation of the cultural assets administered by CPS, on all CPS properties, including those in National Historic Sites, Historic Canals, National Parks, National Marine Parks, and other CPS properties. In the event of a conflict between the direction provided by the ACT manual and that provided by CRM Policy, the latter applies.

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# **VOLUME II**

# **HERITAGE RECORDING**

## **1**

## **INTRODUCTION**

PRODUCED BY:  
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OTTAWA (819) 997-9022

ORIGINAL DRAFT: R. LETELLIER

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7.0 PRIORITIES

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## 1.0 INTRODUCTION

Conservation action in Canada should be based on accurate knowledge of existing heritage resources, informed judgements of their relative value, and public support for their protection. Because it is impossible to protect all heritage resources indefinitely, there is a need to preserve information about them through comprehensive recording. Many nationally significant sites or structures cannot be acquired, but can be recorded. Drawings, photographs and written records can be used to stimulate awareness, to educate and preserve, and most importantly, to become the official archival records of cultural heritage resources.

"In all works of preservation, restoration or excavation, there should always be precise documentation in the form of analytical and critical reports, illustrated with drawings and photographs. Every stage of the work of cleaning, consolidation, rearrangement and integration, as well as technical and formal features identified during the course of the work, should be included. This record should be placed in the archives of a public institution and made available to research workers." So states Article 16 of the International Charter for the Conservation and Restoration of Monuments and Sites (The Venice Charter), produced in 1966 by the International Council of Monument and Sites (ICOMOS).

Parks Canada Policy (1979) states under section 2.2, that "Comprehensive records will be established and maintained in the form of a complete dossier for all historic resources (places, structure, objects) related to national historic parks."

"Information about cultural resources will be recorded and those records will be maintained for the future.

- CPS will maintain up-to-date inventories and dossiers on its cultural resources. Dossiers will contain basic data and related documentation, including the results of research and evaluation, records of decision and action taken. Heritage recording will be carried out on cultural resources of national historic significance." Cultural Resource Management Interim Policy, 1.3.3.

---

## 2.0 RESPONSIBILITIES

Environment Canada is responsible, through the Canadian Parks Service (CPS), for undertaking or co-ordinating national inventories and records in a systematic and consistent fashion.

Currently, two groups are primarily involved in the recording of cultural heritage: the Canadian Inventory of Historic Building (CIHB) of the National Historic Sites Directorate (NHS), CPS, and the Heritage Recording and Technical Data Services (HR&TDS) Division of the Heritage Conservation Program, Architectural & Engineering Services (A&ES). With increasing frequency, both groups work in co-operation with other groups within Public Works Canada, and agencies outside the federal government.

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## 3.0 PURPOSE

The purpose of this manual is to describe the process of detailed recording of historic sites and structures which has been developed by A&ES for NHS over the past fifteen years.

The main objectives are:

- a. to establish policies, standards and guidelines to meet departmental requirements for heritage recording;
- b. to provide departmental staff and consultants engaged in heritage recording with a clear statement of their role and responsibilities in the conservation process\*;
- c. to provide a reference to achieve effective and efficient functional review in recording; and
- d. to provide managers, conservationists, and heritage recorders with an understanding of priorities in heritage recording.

\* The "conservation process" is the sum of all activities required for the logical selection, stabilization, conservation and continuing preservation of an historic site or structure (see Vol. I.2).

---

## 4.0 DEFINITIONS

- a. A "heritage record" is a complete technical dossier of a historic resource which provides necessary basic data for the preparation of conservation research, analysis and/or design, and maintenance and archival records for posterity, normally deposited with the National Archives of Canada.
- b. A "heritage recorder" is a technical expert trained to apply special recording techniques (such as hand recording, record photography, mono-photogrammetry, stereo-photogrammetry, etc.), to provide related descriptive analysis and to produce heritage records that meet the research, analysis, design and maintenance



needs of conservationists and the requirements for archival storage.



*Heritage recording*

- c. "Heritage recording" is the function of producing reliable technical records of historic resources that meet departmental standards as described in this manual.
- d. "Conservationists" are specialists (e.g. historians, archaeologists, architects, engineers, landscape architects, conservators, interpreters, and planners) involved in the conservation process of the CPS's historic resources.
- e. "Descriptive analysis" is a specific responsibility and mandate attributed to heritage recorders which consists of providing conservationists and the National Archives of Canada with accurate and objective records of the design, construction, materials and condition of historic resources.
- f. A "planning team" is a team composed of conservationists and heritage recorders which is responsible for the conservation process of a given historic resource.

## 5.0 IMPORTANCE OF TECHNICAL RECORDS TO HISTORIC RESOURCES

Parks Canada Policy describes Canadian historic resources as "scarce, often unique, non-renewable, tangible relics of man's past. They range from archaeological evidence of man's earliest presence on this continent to recent architecture and technology; from archaeological and ethnographic specimens through documents and antiques to buildings and large tracts of land. All are in some measure creations of the human mind and hands, illustrations from the past which, if preserved, will benefit present and future generations. They are easily destroyed and once gone, can never be replaced."

In the Parks Canada Policy statement (see 1.0) the term "comprehensive record" refers to all data compiled for research, analysis, feasibility studies and reports, including restoration design and master plans, produced by a planning team responsible for the conservation of a historic resource.

Generally, conservationists require accurate technical records as a basis for their research, analysis and reports. These technical records (i.e. graphic, photographic and written data) must be extremely precise and produced using the highest quality of representation so as to ensure that no information is lost during the recording process.

To ensure this, HR&TDS has been established to assist individual conservationists and planning teams in meeting the requirements of their work.

The role of HR&TDS is to assist conservationists and planning teams in the recording and descriptive analysis of historic resources for conservation research, analysis, design and maintenance.

The Services' responsibility is shared between headquarters and regional offices. This ensures that qualified and experienced recorders use the most advanced techniques to produce precise and cost-efficient records that meet program standards related to historic resource conservation and archival storage.

The roles and responsibilities of recorders sometimes overlap with those of conservationists. However, the recorder should not involve himself with conservation research and analysis unless in consultation with the conservationists. Sharing of responsibility (i.e. the conservationist and the responsible heritage recording officer jointly approving heritage records) is discussed in subsequent sections of this manual.



*Petroglyph, Peterborough, ON*

Because of distinct differences between the requirements of various conservationists, heritage records are broken down into four types:

- a. architectural, engineering and marine sites, structures and components;
- b. archaeological sites, digs and remains;
- c. artifacts, art objects, furniture, petroglyphs, etc.; and
- d. historic centres, cityscapes, landscapes and street-scapes.

Definitions and descriptions of each of these types of records are given in Vol. III to ensure consistency and quality of written, graphic, and photographic representation of records. Also, different levels in detailing and in accuracy of records are discussed to ensure almost limitless flexibility in the extent of heritage recording.

With the sharing of expertise and the proper use of sophisticated equipment, heritage recorders are in the best position to cope with the descriptive analysis and recording of historic resources.

## 6.0 LEVELS OF RECORDING

### Step I *Project Identification and Commitment*

### Step II *Initial Studies*

- **Establish project dossier**
- **Preliminary recording and documentation**
- Interim stabilization and/or maintenance
- Theme and objective

### Step III *Property Research and Concept Studies*

- **Detailed recording**
- Research and investigation reports by the:
  - Historian
  - Archaeologist
  - Restoration Architect
  - Restoration Engineer
  - Period Landscape Architect
  - Conservator
  - Planner
- Development concept report
- “Class D” cost estimates

### Step IV *Site Development Plan*

- **“After-stripping” recording**
- Conservation and operations project brief
- “Class C” cost estimates

### Step V *Project Design and Construction Documents*

- **Preliminary and final plans and specifications**
- “Class B and A” cost estimates

### Step VI *Project Implementation*

- Construction/design execution
- **Progress recording**
- **“As-built” record**
- Project dossier transmitted to appropriate document centre or archives so as to be accessible for future research.

### Step VII *Site Operation and Maintenance*

- Operation and maintenance
- **“Maintenance” recording**
- Project dossier updated as required

\* Each step shown above in **bold face** indicates an activity during which systematic recording/documentation is required.

---

## 7.0 PRIORITIES

It is impossible to set guidelines that will ensure that all significant historic resources of national interest are recorded systematically over a given period of time without reassessment of priorities. This is due to unknowns such as revisions to the scope of planning team activities, unexpected "after stripping" recording, and last minute salvage recording, which often interfere with the planned recording process.

The following guidelines, however, have been broadly defined as a basis for establishing a national/regional heritage recording priority program in response to the CPS's policy statement on recording:

- a. Top priority in recording is assigned to all highly significant Canadian historic resources which are in danger of being lost or altered. These resources include both those designated as being of national historical and or architectural significance on the recommendation of the Historic Sites and Monuments Board of Canada, as well as "Classified" properties designated under the Federal Heritage Buildings Review Office (FHBRO).
- b. Second priority is assigned to historic resources related to the current research, analysis, design and maintenance requirements of the National Historic Sites Directorate's program including both those resources designated through the Historic Sites and Monuments Board and those properties designated "Classified" or "Recognized" through the FHBRO.
- c. Third priority is assigned to historic resources which are or may become part of inventories, cost-sharing programs or new acquisitions, the backlog of the CPS-owned historic structures, additional research analysis and design data, and outside agencies' requirements in conservation.

Outside agencies may have recording requirements considered top priority if they qualify, through the assessment of the CPS, as belonging to the category of historic resources described in 'a' and 'b' above.

It is the responsibility of regional Canadian Parks Service Directors-General and the Director-General of the National Historic Sites program to establish through their Heritage Recording officers a short, medium and long-term Heritage Recording Program that complies with the above priority guidelines and meets the CPS requirements.

*Illustrations are the property of the Heritage Conservation Program, unless otherwise noted.*

# **VOLUME II**

# **HERITAGE RECORDING**

## **2**

## **HERITAGE RECORDING TECHNIQUES**

PRODUCED BY:  
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ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
OTTAWA (819) 997-9022

ORIGINAL DRAFT 1980: R. LETELLIER AND J. BELL

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## 1.0 INTRODUCTION

Various recording techniques have been used over the past two decades to produce heritage records. Hand measurements accompanied by record photographs and written documentation were the main techniques applied in a significant way for Parks Canada up until 1970. Rectified photography was introduced as a recognized technique within the recording process in 1971 while the use of stereo-photogrammetry for recording historic structures was initiated within the department in 1973. The application of other recording techniques such as reverse perspective analysis of historic photographs, industrial radiography and thermography have also been carried out at various times in conjunction with the recording work.

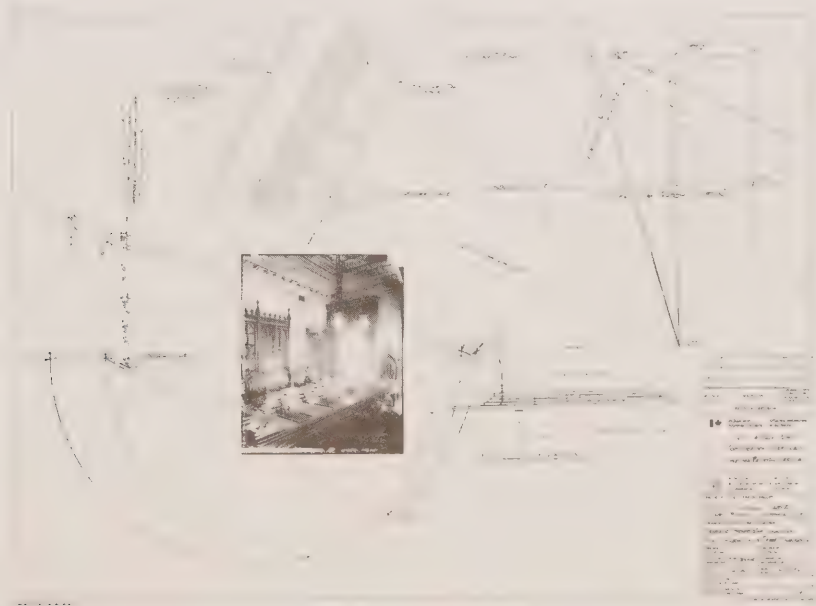
Heritage recording, as an important component of the conservation process, consists of compiling as much technical information as possible into one report. It employs the available recording technique in the most cost efficient and effective way. Prior to any heritage recording project, an evaluation of available recording resources and appropriate recording tools (or techniques) must be made to assess the feasibility of producing a record which will meet specific Environment Canada require-

ments at the lowest cost possible. This evaluation is normally done at the time a request for heritage recording is made. The heritage records for the historic resource must be produced to the Canadian Parks Services' (CPS) standards as described in Vol. II.3.

This article describes recording techniques as they are currently applied by the Heritage Recording and Technical Data Services (HR & TDS) [headquarters and regional] for the Canadian Parks Service. Each recording technique is described separately hereafter, with a brief outline of its applications and limitations. Reference is made to additional recording techniques which can be applied by heritage recorders if required.

Case studies and a cost-benefit analysis regarding the combination of recording techniques in heritage recording are provided in summary so as to increase the understanding of cost efficiency and effectiveness in heritage recording.

It is not intended here to describe in detail the basic technical qualifications required of heritage recorders, as this is considered part of their background training. However, indications as to how to go about gathering historical and extant data and why



*Reverse Perspective Analysis*

it is recorded in such a particular way, are given to ensure awareness related to technical analysis and treatment of historic fabric (such as probing, sampling and stripping). This awareness is most important as the process of heritage recording of historic resources is frequently undertaken only once and in some cases is irreversible due to the removal of historic fabric by other conservation specialists. Furthermore, accuracy in measuring and describing historic resources (such as moulding profiles, paint samples and traces of historic fabric) is most important as analysis, research and design of the historic resources depend on it. To achieve this accuracy recorders must know the subtleties of the trade which have been too often acquired in the past as a result of negative experience.

This part of the manual simply outlines in general terms the recording techniques used by the HR&TDS for CPS. To obtain other descriptions of various aspects of recording, the knowledge of which is essential to the heritage recorder, consult the following publications:

- a. "Interim Guide for Measuring, Recording and Drawing of Historic Structures." Jan. 1968. Illustrated draft compiled by H. Van der Putten, Restoration Officer, Dept. of Indian Affairs and Northern Development, Ottawa, ON.
- b. "Historic American Buildings Survey Manual, Part IX, Survey – Measured Drawings." 1961. Compiled by Harley J. McKee, Architect, National Park Service, Washington, DC.
- c. Bullock Orin M. Jr. AIA. 1961. "The Restoration Manual." An illustrated guide to the preservation and restoration of old buildings. Silvermine Publisher Inc., Norwalk, CT.
- d. "Historic American Buildings Survey Manual, Part V, Photographs and Part VI, Written Data." 1961. Draft compiled by Harley J. McKee for preliminary distribution and discussion. National Park Service, Washington, DC.
- e. "Recording Historic Buildings." 1970. Compiled by Harley J. McKee. U.S. Dept. of the Interior, National Park Service, Washington, DC.

Note: These publications will be referred to later in this manual using the following abbreviations:

- a. Interim Guide
- b. HABS – IX
- c. Restoration Manual
- d. HABS – V-VI
- e. RHB

It is important, however, that heritage recorders realize that

they must refer to the information provided in the above-mentioned publications to the standards and guidelines of Vol. II.3 (Types of Heritage Records) when assembling the recording data into a report.

As this manual will be updated periodically, it is hoped that additional publications on recording and analysis of historic resources will be added to the above list and that the standards of CPS recording services will constantly improve.

### 1.1 PURPOSE AND OBJECTIVES

The purpose of this part of the manual is to define and describe the recording techniques applied in heritage recording.

The main objectives of this article are to:

- a. define the degrees of technical responsibilities related to recording techniques;
- b. define and describe the applications and limitations of heritage recording techniques;
- c. present a cost-benefit analysis pertaining to recording techniques versus recording requirements;
- d. provide heritage recorders and other specialists engaged in the conservation of historic resources with a reference document regarding heritage recording techniques, their applications and limitations and cost efficiency; and
- e. provide heritage recorders with a technical reference document on new recording tools and applications developed by regional and headquarters staff.

### 1.2 DEFINITIONS

See section 4.0 of Vol. II.1 for definitions used in this article.

### 1.3 TECHNICAL RESPONSIBILITY AND QUALIFICATIONS

Responsibility for producing accurate heritage records is extremely important as inaccurate or incomplete records may result in significant errors in subsequent predesign analysis and research as well as in final design, project implementation and maintenance. To be designated a heritage recorder (with the ability to provide a high standard of technical support in heritage conservation) one must acquire the necessary basic technical training to successfully use recording techniques as described in Vol. II and possess the necessary experience and knowledge to understand and meet the specific recording requirements of the department's conservation professionals and planning teams.

A minimum of two or three years of heritage recording experience is necessary to attain the intermediate or senior level of competence in heritage recording. As for technical qualification requirements, they vary with the sophistication of the recording techniques applied. These qualifications are described separately with each technique.

Those that undertake recording without meeting the above-mentioned criteria are likely unsuited to ensure cost efficiency and effectiveness in heritage recording and to meet CPS standard requirements.

Each recording project being different, the extent of data to be recorded or collected depends entirely on the heritage recorder's judgement and experience. The recorder must understand clearly the purpose of the recording project, recommend terms of reference for recording and make decisions during preliminary discussions and during field operations so that the final products meet the specific requirements of the job. In difficult situations, recorders must use judgement if they cannot call upon their supervisor or the client conservationists to be given guidance when a problem is more complex than they feel qualified to handle. For this, the recorder must know the roles and responsibilities of the individual conservationists.

#### 1.4 APPLICATIONS AND LIMITATIONS OF RECORDING TECHNIQUES

Each conservationist must be familiar with the applications and limitations of recording techniques. The quality and level of their subsequent conservation studies could be increased significantly with proper use of these services.

This knowledge will also permit conservationists to evaluate their own recording requirements prior to planning team meetings. Good knowledge of the applications and limitations of each recording technique is mandatory for heritage recorders, regardless of their specialty, to ensure that proper techniques are selected and applied economically and efficiently.

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## 2.0 WRITTEN DATA

Preparing written information is considered a recording technique in that it is the aspect of heritage recording that makes the graphic components (drawings and photographs) relate to each other. The results of the written, drawn and photographic recording techniques are then combined into a comprehensive

technical report (or record). What makes a heritage record invaluable to conservationists is the metric accuracy and the high degree of descriptive analysis which is achieved by a precise record of the historic resource. This description can only be achieved by the recorder's understanding of the specific requirements of each conservation specialist and the meaning (or value) of the historic resource itself. As a result, the subtleties in design, construction, condition and composition can be clearly and objectively recorded and described using precise terminology.

### 2.1 DEFINITION

Written data, for the purpose of this article, is the precise technical description of historic resources which must accompany the drawings and photographic components of the heritage record in order to meet the Canadian Parks Service's conservation analysis, research, design and maintenance requirements. It is also an essential part of the comprehensive archival record required by the Department for heritage resources.

### 2.2 TECHNICAL RESPONSIBILITY AND QUALIFICATIONS

It is the responsibility of the heritage recorder to ensure that the graphic data is accompanied by written data which provides full comprehension of a given recording project as defined and described in Vol. II.3.

To be qualified to undertake this responsibility, the recorder must meet the general requirements stated in Section 1.3, above. Recorders must use precise terminology, specific to the historic resource being recorded (military structures, marine vessels, archaeological remains, landscapes, furniture and art objects all have their own special vocabularies). This is to ensure accuracy, consistency and conciseness throughout the heritage records and subsequent research and analysis reports. The ability to select and use the proper terminology is mainly acquired by field and laboratory experience with the various conservationists.

### 2.3 APPLICATIONS AND LIMITATIONS

Written data is used when a heritage record contains graphic data that is incomplete in itself, which, in fact, occurs in most cases. It is used extensively in the heritage recording report to describe all aspects of the recording project (see Vol. II.3). It ensures proper technical analysis of the subject matter which is invaluable to the comprehensiveness of the record as required for conservation analysis, research, design and maintenance and as required for archival records.



The extent of written documentation is determined by the “purpose and terms of reference” defined in the request for heritage recording and by the recorder’s judgement. Prior to providing written data as part of a heritage record, read:

- a. “Interim Guide”; sections 9.1, 9.3, 9.3.1, 9.3.2, 9.3.4 and 9.3.5;
- b. “HABS – VI”; pages 71 to 86; and
- c. “RHB”; pages 97, 105 to 119.

### 3.0 HAND RECORDING

Hand recording is the traditional method of producing measured drawings of historic resources. The techniques of hand recording have evolved over several hundred years. During the Renaissance, the first schools of architecture taught the principles of design by having students hand record existing architectural landmarks.

Modern hand recording dates from the work of Stuart and Revett in the late eighteenth century. Their recording of the antiquities of Athens and the mid-nineteenth century work of Letarouilly *Édifices de Rome moderne* established the basic format of plans, elevations, sections, details and moulding profiles for compiling the results of hand recording.

In the twentieth century, the work of the Historic American Buildings Survey in the United States and of the Royal Commission on Historical Monuments in Great Britain have combined accuracy and artistic effect. The work of the CPS recording teams has been characterized by even greater levels of accuracy and detail, with less emphasis on pictorial quality.

Hand recording requires very little expensive equipment other than tape measure, plumb bob, transit, pencil and paper and this accounts in part for its widespread use. Today, new measuring devices and the possibility of direct input to computerized storage and retrieval systems are beginning to broaden the scope of traditional hand recording. Other recording techniques such as photogrammetry usually must be supplemented with the use of hand recording or vice versa, to provide a complete dossier.

#### 3.1 DEFINITION

Hand recording, for the purpose of this manual, is defined as the use of hand measurements to produce accurate and definitive measured drawings of historic resources.



*Hand Recording*

#### 3.2 TECHNICAL RESPONSIBILITY AND QUALIFICATIONS

It is the responsibility of the designated heritage recorder to ensure that the use of hand recording supplements other recording techniques in the most economical and effective way to meet CPS requirements for the production of heritage records. The low cost of hand recording in terms of equipment and training must be balanced against the labour-intensive nature of this technique and the difficulty of access to some areas of larger structures.

Technical qualifications depend on the level of recording being carried out. It is assumed that the same recorder or recording team will prepare the site, carry out the field recording and produce the final measured drawings. This continuity is needed to ensure the accuracy of the final product.

For a preliminary survey, a recorder or team with one or two years experience should be qualified to produce the required photographs and drawings.

For a preliminary record, a more qualified team is needed with the experience and the equipment for such tasks as taking moulding profiles, recording structural details and describing physical condition.

For a complete detailed record, a senior team with extensive experience is needed which can set up a grid, carry out an exhaustive recording process and translate the field information into a properly organized and annotated set of drawings.

### 3.3 APPLICATIONS AND LIMITATIONS

Hand recording is used extensively because it can be tailored to provide exactly the type and level of information required and to translate that information directly to drawings and notes. It is applicable to both interiors and exteriors, to areas both large and small and to items both isolated and hidden.

Hand recording is an excellent way of becoming familiar with a resource, since the process itself involves close observation and interpretation of the layout, materials and construction assemblies. Unique or significant aspects of a resource may become obvious in the course of producing field notes or laying out measured drawings.

Hand recording can be used to provide a complete record of a site, including plans, elevations, sections and details, as well as constructed perspectives and axonometrics. It can also be used in a more limited way to supplement record photography or photogrammetry.

One of the major limitations of hand recording is the time-consuming nature of the process. For some preliminary surveys, floors and walls of buildings and other structures are assumed to be at right angles. The hand recording is then limited to measuring the height, width and depth of these surfaces and the location of openings. For more detailed and complete surveys, various diagonals can be measured to allow the exact angles between the various elements to be determined. An alternative and even more precise method is to establish a three-dimensional reference grid independent of the structure itself and to take all measurements from the grid. This is a method generally used by the CPS recording teams, allowing deformities and anomalies to be accurately recorded and positioned in space. It is important to choose the approach most suitable to the level of information required.

It is important to supplement hand recording with record photography and photogrammetry when appropriate. Some complex or subtle details can be more economically and effectively captured in a photographic image. Sometimes these images are integrated into the final drawings. Certain curved or other inaccessible surfaces are best recorded using photogrammetry.

Hand recording is most efficient and economical when recording small structures, assembly details, cross sections and condition of assets, tailored to the immediate requirements of the conservation team.

## 4.0 RECORD PHOTOGRAPHY

Every time a photograph is taken, a record is produced freezing a visual image in time. In many cases this is done without the photographer realizing that the record may become a rare and useful document that could be referred to in the future for research, analysis and design. When a photograph is taken with the intention of creating a specific record, the photographer will ensure that all precautions are taken to maximize the potential uses of the information it will contain. This latter approach to photography is called record photography.

### 4.1 DEFINITION

Record photography, for the purpose of this manual, is defined as the use of the camera to produce accurate and definitive visual records of historic resources.

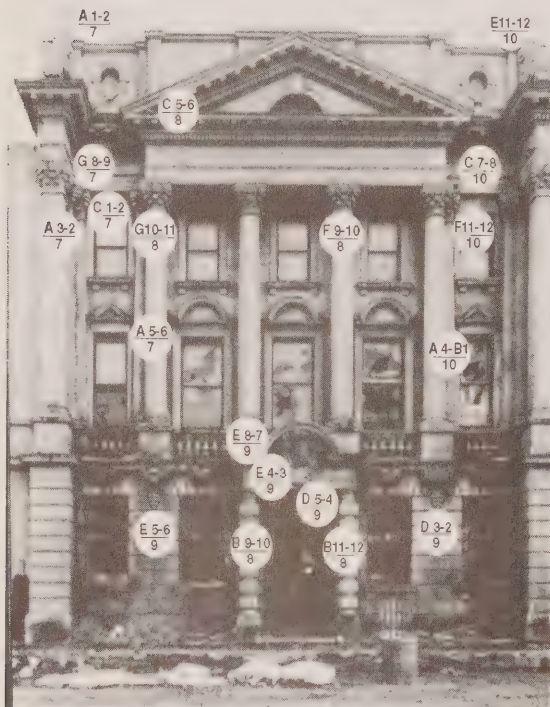
### 4.2 TECHNICAL RESPONSIBILITY AND QUALIFICATIONS

It is the responsibility of the designated heritage recorder to ensure that the record photograph supplements other recording techniques in the most economical, efficient and effective way to meet the CPS requirements in the production of heritage records as defined and described in Vol. II.3. The selection of proper equipment and material assures archival processing and printing of photographic data. An error in using this technique could result in the loss of unique data of a historic resource which might no longer be accessible due to either destruction or alterations made to the resource.

The technical qualifications required to assume this responsibility depend on the purpose of the record and therefore are broken down into two levels. When taking technical photographs to complement the data provided by other recording techniques, a person with intermediate or preferably senior, photographic



experience and knowledge is required. When dealing with more artistic types of photography, to be used for publications and displays, a professional architectural photographer is strongly recommended.



*Record Photography*

#### 4.3 APPLICATIONS AND LIMITATIONS

Record photography is used extensively in heritage recording due to its capability to quickly provide a large amount of visual data at low cost. It is indispensable to written data as well as to measured drawings in that it complements both these techniques where the shape, condition, traces and texture of the historic resource cannot be represented accurately otherwise. It also provides supplementary information to mono-photogrammetric representations and from stereo-photogrammetric recording techniques when the object being recorded is partly hidden by foliage, vehicles or other elements which cannot be avoided due to limitations of angles of view in photogrammetric recording.

Record photographs are most useful to describe general views of a site, structure or artifact. When accompanied by brief annotations and a photo key plan, one can easily record small details of any nature, from the general views listed previously. When no accurate measurements are required this technique, when applied with skill, is most effective in the recording of any historic resource and will meet many of the requirements of conservationists in their research and studies.

Record photographs are also used as a visual aid to assist heritage recorders in drafting details such as texture, traces or wear marks onto measured drawings.

Even though a graphic scale may be included in a record photograph for general reference purposes, accurate measurements generally cannot be obtained from these photographs unless points of control are established for direct measurements from the photograph itself. This particular approach to photography uses scaled and rectified photographs. When done on an organized and thorough basis, this becomes mono-photogrammetry as discussed in subsequent section.

Prior to undertaking record photography, read:

- a. "Interim Guide"; sections 6.0 to 6.4, 9.3.3;
- b. "HABS - V"; pages 1 to 24; and
- c. "RHB"; pages 63 to 97.

## 5.0 RECTIFIED PHOTOGRAPHY

### 5.1 DEFINITION

Rectified Photography (RP) is a low-cost, low-level recording technique that consists of extracting metric information about an object through the use of single photographs. The taking of such photographs offers a means of conducting fairly accurate and rapid surveys. Photographs define a particular scene in time and are thus indispensable to the needs of the researcher and the technical design staff.

Stone patterns, brick detail, wallpaper, flat objects and other features on plane surfaces can all be recorded to an acceptable accuracy quickly through the use of single photographs. In all cases the objects should represent a single plane without substantial relief.

Rectified photography can be defined as the process of taking photographic images and transforming them into an orthogonal representation by removing any tilts that may exist in the imagery. Since only tilts are being removed there is no provi-

sion for correcting the displacement of photographic details due to "relief". Relief is a term used to define the distance that individual points in a photograph are off the main reference plane. This reference plane can be oriented to parallel major planes of buildings, landscape features or engineering structures.

### 5.1.1 Principles

From the above, it is clear that the principles of rectified photography are best applied to objects consisting of flat surfaces with negligible amounts of relief. The greater the amount of relief, the less accurate will be the final product.

In essence, the application requires that the film plane parallels the reference plane of the object. This may be accomplished through field or laboratory rectification. The final product consists of scaled and rectified prints from which direct measurements can be made. Known measurements or a system of control points must be used in order to obtain scaled prints.

### 5.1.2 Requirements for Rectified Photography

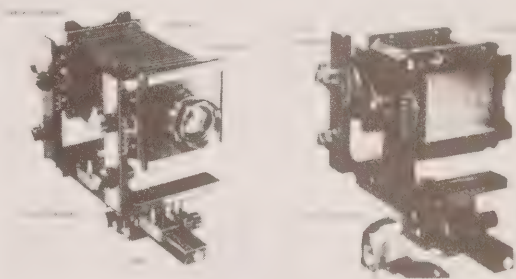
The following should be kept in mind:

- a. Good quality lens should be used, those that offer minimum lens distortions and aberration (the wider the angle of view of the lens the greater will be the problems of distortion).
- b. A large format camera system offering a film size of 100 mm x 125 mm or larger should be used. This becomes significant when enlarging the negatives to a presentation scale such as 1:20; with large format cameras the resulting prints will have a sharp definition.
- c. A camera system that allows the negative plane to parallel the object plane being rectified.
- d. Control, both vertical and horizontal, which will allow enlarging the resulting rectified prints to scale and will provide a means of defining a plane of rectification. A plane is defined by three points with one additional point to define a unique plane.

### 5.1.3 On-site Rectification

This method involves arriving on site and performing the actual rectification of the photographic negatives in the field. These negatives can all be to the same scale or not, depending on the site conditions. If the first procedure is adopted the laboratory procedure is simplified with the use of only one enlargement factor on the photographic enlarger. To do so:

- a. the film and lens plane are made parallel to each other;
- b. the film plane will always remain flat; and
- c. the film plane can be made perpendicular and parallel to the major reference plane as defined by the object.



View Camera

The above basically describes the design parameters and capabilities of metric cameras. The flatness of the film plane is usually guaranteed by employing photographic glass negatives or in the case of film, film-flattening devices. The second camera system is one that would allow individual movements to be made to the lens and film planes so that a. to c. above could be realized. These conditions are fulfilled by several manufacturers of non-metric, large-format cameras.

Using RP cameras requires a measured distance on the object for scaling. The use of non-metric cameras requires a system of control points to fulfill conditions a. to c. These points are also used to maintain scale. A method of "On Site Scaled Rectified Photography" has been described extensively by Hockey, Chambers, etc.

### 5.1.4 Office Rectification

In adopting this approach the field camera work is somewhat reduced and could be useful when time on site is limited. The actual rectification process is removed from the field and transferred to the photographic laboratory.

The field procedure is basically to establish the necessary control points or distances, roughly orient the camera and take the photographs. To avoid any problems that might be encountered in using the laboratory equipment (mechanical limitations) it is highly recommended that the resulting negatives be as close to being rectified as possible.

The introduction here of the three pieces of laboratory equipment is appropriate. The first and the most sophisticated is the rectifier-enlarger. Its main components are a negative carrier, a projection lens and an easel. Both negative carrier and easel are capable of being tilted. By applying these tilts the rectification is possible.

For negatives that have been already rectified or partially rectified in the field a good quality photographic enlarger is all that is needed to complete the rectification. Essentially what is required is straight photographic enlarging with the incorporation of very slight tilts to the easel.



*Photogrammetric Rectifier-Enlarger*

## 6.0 STEREO-PHOTOGRAMMETRY

Simply stated, photogrammetry is the art and science of obtaining reliable measurements from photographs. It is based on the principle that light rays coming from the object travel in straight lines through the camera lens and image themselves onto a flat negative material. Any deviations from this will cause discrepancies in the final result. Aerial photogrammetry is the most common application, as utilized in the production of topographical maps.

Applying the principles of photogrammetry to cultural resources is sometimes called "architectural photogrammetry" or "close range" photogrammetry. In practice, geometrical information about a historic resource may be obtained through the use of a single photo-

graph or a combination of two overlapping photographs called a stereo-pair. The decision as to which is most appropriate will be explained in subsequent sections of this article.

### 6.1 ITS USE

Extensive recording of Canada's historic resources through the use of traditional hand measurement has occurred on an organized basis over the past two decades. Problems arose in documenting accurately highly decorated elevations, deformed surfaces, reflected planes of building ceilings vaults and domes and street elevations. Photogrammetric techniques offer the following advantages:

- a. there is no direct physical contact with the object to be recorded;
- b. the procedure is relatively unobtrusive – important where facilities are still in use;
- c. considerably less field time is required when recording sites of a more complex nature or those threatened by demolition;
- d. a photograph is comparatively objective and whatever appears on the photograph can be accurately reproduced – in classical hand measurement the extent of the recording is a function of the understanding of the purpose of the drawings;
- e. the pictorial information produced by the photogrammetric technique is much more comprehensive than that of the field notebook of the hand recorder;
- f. through the use of photography all components are recorded with equal accuracy and therefore not point dependent as in the case of hand measurement;
- g. intentional variations from standard architectural features are more readily identified; and
- h. when time and cost restraints dictate, the photography and accompanying field survey can be undertaken without the necessity to produce final drawings; these can be produced at a later date.

#### 6.1.1 Limitations of Use

The elimination of hand measurement in the recording process by photogrammetry may appear feasible. The following shortcomings in the photogrammetric process illustrate the contrary:

- a. only what appears on the photographs can be reproduced accurately; all obstructions appearing in front of the object will limit the amount of information derived;
- b. sectional views with concealed information are not possible;
- c. limitations in the object-to-camera distance may make it impossible to set up the camera;



- d. depending on the object height and camera position, detail may be obscured due to overhangs, ledges or other obstruction;
- e. assembly details of structures and objects cannot be recorded; and
- f. tiny spaces such as crawl spaces and others are most difficult to record.

## 6.2 PRINCIPLES

The utilization of two overlapping photographs taken from separate vantage point forms the basis of stereo-photogrammetry. People are capable of perceiving three dimensions because of the following: each eye perceives a certain scene but, because of their separation, each eye's image is not exactly the same. The brain fuses these two different scenes into one; and only that part of the image which is common to both permits viewing in three dimensions.

In stereo-photogrammetry the eyes are replaced in the field by cameras separated by a certain distance used to simulate the eye base. Through the use of special cameras and plotting equipment, plans, contour profiles, cross-section views and elevation drawings may be produced.



## 7.0 REVERSE PERSPECTIVE ANALYSIS

The use of historic photographs to obtain period information is well documented. These photographs are used extensively as a complementary visual aid in interpretation and less extensively as a method of obtaining measurements. Knowledge and experience in the reverse perspective analysis technique is scarce because it requires a combination of assumptions, knowledge of the historical circumstances and a good understanding of geometry.

### 7.1 PRINCIPLES

In applying reverse perspective analysis numerous approaches are available, varying from project to project. Ground oblique, aerial oblique and horizontal photography as well as underwater photography can be readily evaluated. The success in doing so is based on the investigator's ability to estimate or re-establish camera stations using vanishing points and horizon lines in the photograph. The following are considered when applying the technique:



*Aerial Photogrammetry*

- a. it is assumed that the object has not been subjected to significant deformation – lines are horizontal, corners are vertical, etc.;
- b. to obtain some sort of scale in the final product, there must be a known distance on the object or an assumed dimension of standard architectural features of the time; and
- c. accuracy in the final product should not be a major determinant of the technique but calculating proportions is more feasible.

## 8.0 FIELD RECORDING PROCEDURES AND EQUIPMENT

### 8.1 CAMERAS AND CAMERA STATION LAYOUT

For the majority of stereo-photogrammetric recording a “normal case” camera set-up is applied. The basic configuration comprises a camera baseline, the ends establishing the location of the camera stations. The optical axis of the cameras are oriented perpendicular to the baseline and horizontal. The baseline is made to parallel the major reference planes of the object or portion of the object to be recorded. Together photographs A and B are called a stereo-pair. Alternate camera configurations are possible. The magnitude of the angles for tilting and swinging of traditional type cameras off the baseline are quite limited and depend heavily on the plotting equipment being used.

A stereo-photogrammetric record consists of establishing as many stereo-pairs as is necessary and feasible to record the object entirely. Fig. 1 illustrates the camera stations. They can also be located on the ground, on scaffolding, buildings, cherry pickers, boats and even aircraft.



*Stereo-photogrammetry Example*

As a general rule, the length of the baseline (B) is related to the camera to object distance (Y) as follows:  $1/10 \leq B/Y \leq 1/4$ .

Two major types of photogrammetric cameras are available. They are the single universal camera and the double or stereo-metric camera. Stereo-metric cameras are fixed-based, usually 120 cm or 140 cm long. Because of this, they are confined to small camera-to-object distances and therefore most frequently used to record small objects.

Larger objects require a greater camera-to-object distance and more flexibility in the establishment of the length of the camera base. Use of a single camera unit allows for this.

Cameras used in architectural stereo-photogrammetry should provide the following:

- large angle of view
- low distortion/high resolution optics
- variable diaphragm
- focusable objective
- shutter or lens cap
- a means of ensuring a single negative plane
- a means of camera orientation and tilt
- fiducial marks used to define the principal point of the lens
- ability to interchange horizontal and vertical formats

### 8.2 SURVEY CONTROL

The taking of the stereo-pairs constitutes only half of the information necessary for a stereo-photogrammetric field recording. The other half involves providing survey control. This control is essential for re-establishing the one-to-one correspondence of the photographs of the stereo-pairs, for scaling and for providing a means of relating all parts of the object to each other.

If the object to be recorded is small or only single stereo-pairs are required to complete the recording, control in the form of a number of survey rods (or other graphic scale devices) in the object space or measured distances on the object is sufficient. In the case of measured distances, the longer the better.

The taking of many stereo-pairs requires that four well-defined surveyed points appear in each stereo overlap. The points chosen should appear as closely as possible to the four corners of the negative. Points can either be natural features of the object or pre-targetted points. Natural points should be chosen so that they are clearly visible on the negative, well defined (brick cor-



ners, mortar intersections, etc.) and easily distinguished from other features of the object.

The following illustrations show two possibilities of targets to be used. The size of such targets depends on the final photo scale and should be clearly visible at this scale. The size of the measuring mark in the evaluation equipment is also of major concern. Care must be taken that the targets appearing on the negative are approximately  $5/3$  the size of the measuring mark. The exact position of the control points are calculated within a three dimensional rectangular co-ordinate system taking the form of X, Y, Z co-ordinates. It is normal practice to orient the X-axis parallel to one of the major axes of the object.

To ensure that all parts of the object are within one reference recording system, a closed traverse is recommended completely around the object. From the traverse, the X and Y positions of the cameras, intersections and polar tie-in stations are determined.

The Z position is determined through the use of the technique of spirit levelling. The polar tie-in and intersection stations are used to establish the co-ordinates of the control points located on or in the object space. The method of intersection is the most accurate means of locating these points while the use of the polar tie-in method is relegated to locating control points near ground level. Forms entitled:

- Traversing and Side Shot Record
- Polar Tie-in Record
- Levelling Record
- Record of Final Co-ordinates
- Intersection Record

outline information necessary for a complete photogrammetric record. The measurement of angles should be undertaken using a one-second theodolite. Distances can be measured accurately using modern EDM equipment. Automatic levelling equipment of the Wild NAK-2 variety should be used to undertake the spirit levelling.

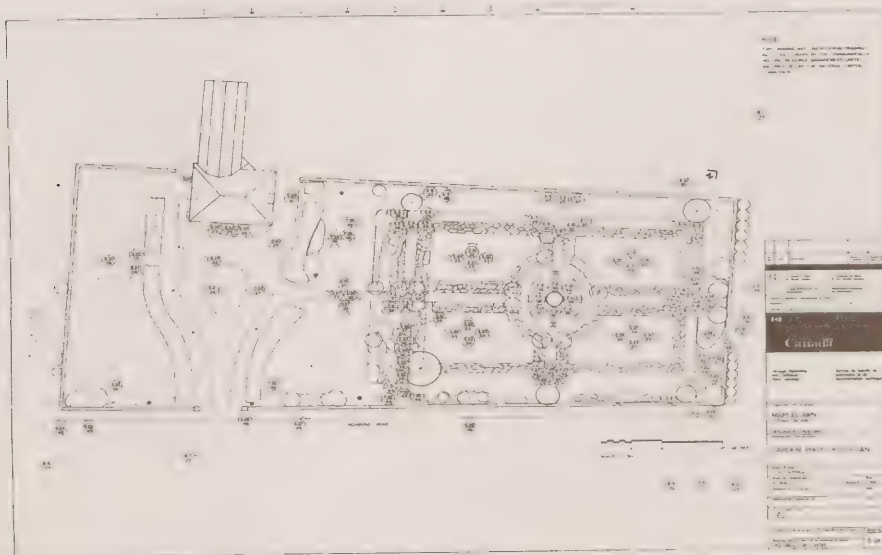


Fig. 1 Camera Stations - Garden Photo Key Plan



*Examples of Types of Targets Used*

### 8.2.1 Data Reduction

With the field operations (photography, surveying) completed it is possible to evaluate the gathered data in several ways. Analogue and analytical evaluation techniques will be discussed. Before doing so, it is appropriate to mention here that the field data can be stored without undertaking any additional work. This becomes very significant when time and costs are major constraints. The processed negatives and survey data may be stored until such time as specific information about the object is required.

## 8.3 ANALOGUE APPROACH

This method provides for the production of plotted drawings as a final product in the recording process. As illustrated, the left and right negatives of a stereo-pair are inserted into the left and right photo carriers of the plotting machine. Looking through the oculars, the operator views only the left image with his left eye and only the right image with his right eye. The brain fuses the two images to allow stereo viewing. Within each ocular appears a reference dot. With the aid of handwheels and a foot disc, the operator is able to move the reference dot throughout the stereo-model.

Using the control data, the operator is able to re-create the stereo-model at a definite scale and within the prescribed co-ordinate system.

The operator merely guides the dot along features to be plotted; this movement is transmitted to a pencil or pen on the plotting table which draws the features to a predetermined scale.

Various types of plotting equipment have been developed. In some cases the equipment has been designed to be used with a specific type of photogrammetric camera. Other types have been developed to meet the needs of the aerial mapping industry. Combinations of

photogrammetric camera and plotting equipment are varied, depending on the camera parameters and the geometry of the stereo-pairs. The plotting system as presented is an optical, mechanical or optical-mechanical system.

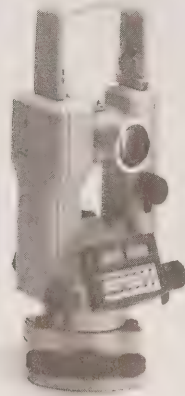
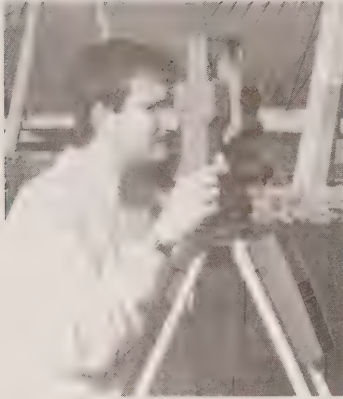
The accuracy in the production of record drawings of archival quality using the analogue approach depends on many items. Of major concern is the geometry of the stereo-pair, the accuracy of the plotting equipment and the operator's ability to manually orient and fit the stereo-model to the survey control.

When selecting plotting equipment (other than for those built specifically for terrestrial needs) the following should be borne in mind:

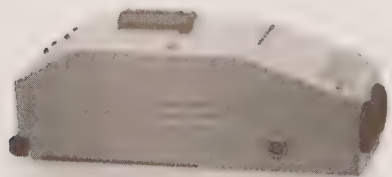
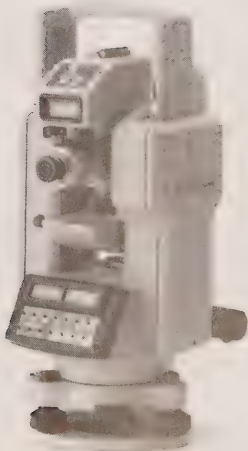
- a. choose an instrument with a focal length range capable of accepting photography taken with a low focal length lens (i.e. 60 mm to 200 mm);
- b. the instrument chosen should have independent movements of the perspective centres; (i.e. by, bz and bx from 0 to 200 mm);
- c. the orientation elements  $Q'$ ,  $Q''$ ,  $W'$  and  $W''$  should have a large enough range to accommodate tilted and swung photography 15 to 30 grads;
- d. the instrument should have a YZ interchange allowing the capability of producing profiles and contours; and
- e. as large a Z range as possible is desirable (i.e. 140 mm to 490 mm).

### 8.3.1 Limitations

- a. No possibility to apply corrections for lens distortion, unflatness of negative material, shrinkage of negative through photographic processing, etc., therefore unable to plot from non-metric imagery;
- b. mechanical limitations in the choice of focal lengths, negative size, plotting scales;
- c. orientation of cameras and baseline in field operations limited;

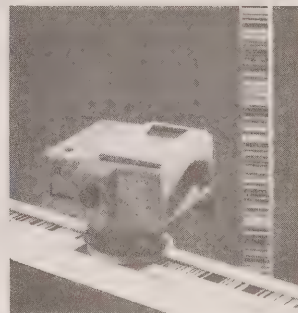
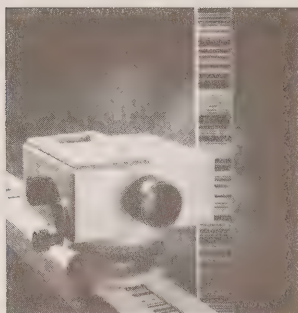


*One-second Theodolite*



*EDM Equipment*

*(Leica)  
Illustrations courtesy of Leica Canada Inc.  
Nepean, ON*



*Automatic Leveling Equipment  
Illustrations courtesy of Leica Canada Inc. Nepean, ON*

- d. little flexibility in the choice of the reference recording planes;
- e. camera angle of view limited; and
- f. unable to plot the developments of cylindrical or conical surfaces on a plane.

#### 8.4 ANALYTICAL APPROACH

This is the most accurate and flexible of the two approaches. It is possible with the utilization of computer technology. The concept of a computer assisted plotter has been greatly exploited over the past 30 years. Testament to this has been shown by the introduction several years ago of approximately seven new models of analytical plotters. The basic system comprises an optical mechanical stereo-system, a computer, a plotting table and peripherals. The limitations of the analogue approach are non-existent in this system. In addition,

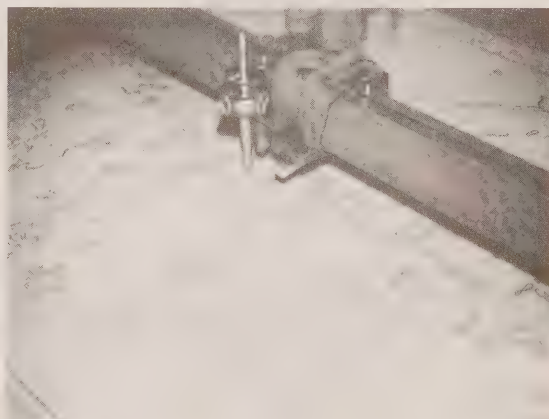
greater speed and accuracy are achieved by utilizing the computer to fit the stereo-model to the survey control. Many computer adjustments and refinements to the stereo-model are possible.

There exists in the analytical approach a second possibility to evaluate the information contained on the photographs. The plotter is replaced by an instrument used to measure co-ordinates on the negative. The instruments referred to are mono- and stereo-comparators. Using the model co-ordinates and analytical photogrammetry programs, the computer provides digital information about the object. This information can be used as such or used to produce digital plots.

The advantage of the first system over the second is that on-line plotting is possible. All details are plotted as they appear and not interpolated from the digitized data. A satisfactory interpretation would involve extensive amounts of digitized data.



*Analytical Plotter*



*Flatbed Mechanical Plotting Table and Application*

*Illustrations are the property of the Heritage Conservation Program, unless otherwise noted.*





# **VOLUME II**

# **HERITAGE RECORDING**

## **3**

## **TYPES OF HERITAGE RECORDS**

PRODUCED BY:  
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ARCHITECTURAL AND ENGINEERING SERVICE  
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## 1.0 INTRODUCTION

This article contains a detailed description of the spectrum of heritage records which are produced under the direction of Architecture and Engineering Services (A&ES). The information provided hereafter is complementary to the aspects of heritage recording presented under other sections of this manual.

### 1.1 BACKGROUND

Originally, the recording of structures of architectural and historical value was initiated by the Canadian Parks Service (CPS) as a means of "conservation of information through recording." To fulfill this mandate, measured drawings along with technical photo reports containing written descriptions of the condition of structures, were prepared by and for A&ES staff.

Soon, it became apparent that the accuracy of the record drawings and written information were invaluable to other departmental staff involved in the conservation of historic sites and structures. From them, architects, engineers, historians and planners could prepare comparative studies, feasibility studies and working drawings. The accuracy of the recording techniques used by A&ES or by the contract staff providing recording services to A&ES, became appealing to staff archaeologists as a means of preparing basic records of sites, remains, and in some instances artifacts. These records became invaluable as reference material in the preparation of reports and for interpretation studies. More recently, other groups working under the Research, Conservation and Interpretation Branches of CPS have come to use the Heritage Recording Services in the recording of cityscapes, artifacts, and art objects using sophisticated tools.

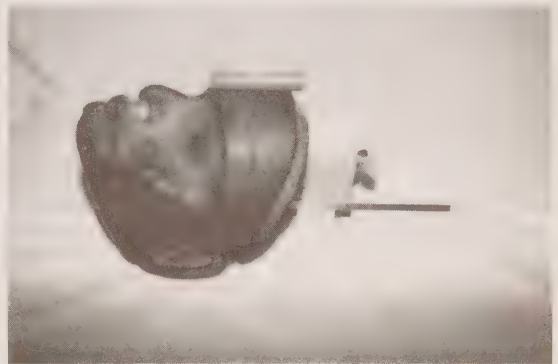
During the past two decades, different approaches in recording have been adopted and various types of records have been developed to meet the specific requirements of the abovementioned conservationists. With this evolution, terminology used to identify various levels of recording has varied. The updated terminology is introduced in this article and where necessary, reference is made to previous terminology to clarify changes.

## 2.0 PURPOSE

The purpose of this section is to define and describe the various types of heritage records developed during the past twenty years.

The main objectives are:

- a. to establish departmental standards and guidelines for those involved in heritage recording;
- b. to define responsibilities related to the legal aspect in using heritage records for professional consultant work;
- c. to provide reference material for functional review of heritage recording; and
- d. to provide departmental conservationists with a detailed understanding of the types of heritage records produced and the potential use of them.



*Recording*

## 3.0 SCOPE OF WORK AND RESPONSIBILITY

The Heritage Recording Services of A&ES for CPS has the responsibility to ensure that high standard technical heritage records of historic sites, structures and their components (or artifacts) are produced as part of the conservation process.

Heritage Recording Services has been given the mandate to manage all technical documents required for A&ES operations and is now referred to as Heritage Recording & Technical Data Services (HR&TDS).

## 4.0 ARCHITECTURAL, ENGINEERING AND MARINE RECORDS

### 4.1 INTRODUCTION

Architectural, engineering or marine records of historic sites and structures are normally produced as part of the first three or four phases of the conservation process. These phases deal with Conservation Commitment, Initial Conservation, Property Research, and Project Implementation (Vol. I.2).

These records are generally initiated by the Conservation Project Team which is responsible for the analysis, design and development of a historic site or structure. However, records may also be requested strictly for special studies or for archival purposes.

In order to simplify the description of each of the types of records, the complete detailed record is presented first because, as its name implies it is the most complete of all. It is easier to then compare the other records to this one in terms of extent of accuracy and detail.

### 4.2 STANDARDS

There are standard symbols and guidelines established to produce uniform and legible drawings. They conform with storage, reproduction, and microfilming requirements as well as the specialized nature of the drawings. These standards and guidelines for drawing symbols should be followed as closely as possible. If a departure from standards is considered necessary, please indicate the changes on the drawing so that everyone will be aware of the changes.

#### 4.2.1 Description

The following is a list of symbols used as well as sizes of sheets, recommended scales, etc.

The standard drawing sheet used by CPS is the "B1" format which is 1000 mm x 707 mm, precut with the border as well as title block preprinted. The material is tough polyester drawing film with a high shelf expectancy, suitable for ink and pencil work of technical and illustrative nature, reproducible with a minimum loss of line quality.

The drawing scales should conform with standards set for the use of the International System of Units (ISU).

### 4.3 COMPLETE DETAILED RECORD (Previously "AS-FOUND RECORD")

#### 4.3.1 Definition and Use

The Complete Detailed Record assures an extremely accurate compilation of pertinent data pertaining to a historic site or structure and its typical components using graphic, photographic and written means of representation.

In the event of destruction of the resource, this type of record should at its limit permit the full reconstruction of the site or structure and any of its components as they were found at the time of recording. Generally, a Complete Detailed Record is produced when a historic resource has been funded by the Department for development or conservation.

The extent of a Complete Detailed Record is determined by the conservation project team in consultation with heritage recording experts. The usefulness of a heritage record is largely dependent upon the judgement of the recorder and therefore a thorough understanding of the specific purpose of each individual recording project is indispensable.

Complete detailed recording should be produced by staff experienced and trained in the field of conservation and supervised by professionals. Broad knowledge of departmental recording techniques and tools is necessary to ensure efficient and effective results at low costs.

The Complete Detailed Record consists of such information as floor plans, exterior elevations, sections, structural details and other information relevant to the structure and its components. The extent of the record should allow the reproduction of the entire monument or any of its components as they were found during the period of recording.

The accuracy usually encountered is plus or minus 2 cm for plans and elevations, plus or minus .5 cm for details, and exact dimensions for hardware and mouldings. Consult the remaining sub-sections under 4.4 for more details about individual components. All drawings should be produced according to standards as described further under this subsection.





*Parliament Buildings, Ottawa, ON*

#### 4.3.2 Project File

Quite often when confronted with the task of providing basic information (plans, sections, photographs) for the various stages of the conservation process an enormous amount of auxiliary data is also gathered. It is from this data that the basic information is derived. Whenever the recording project has been completed the auxiliary data as well as any official correspondence generated should be set aside and filed in an orderly manner subject to existing filing standards. This latter process of filing takes the form of what is commonly known as a Project File, while the official correspondence serves as a means to avoid any misunderstanding arising from scheduling, content, transmittal, etc.

These project files are essential for various reasons. They allow the possibility of checking any discrepancies that might have occurred between the information derived and the actual field situation; they sometimes contain additional auxiliary data which might be useful in supplying information not originally requested but nonetheless valuable to the conservation team or any other interested body or individual at a later date. They can be used to redraw any or all of the drawing set if ever the case should arise.

For the purposes of this manual two types of project files will be dealt with in detail, namely those of hand recording and those of photogrammetry.

#### 4.3.3 Description

Photogrammetric project files are divided into two segments. The first part contains all official correspondence concerning the project from the time it is initiated until the time it is completed, while the second part is set aside to contain all field notes and auxiliary data necessary to realize the recording.

The official correspondence file can contain any of a number of documents such as:

- a. a letter initiating the project;
- b. detailed request for recording – indicating scales, details to be recorded, special considerations, completion dates, etc.;
- c. letters indicating changes to the original request after the project is in progress; and
- d. letters of transmittal of documents.

In carrying out a survey by photogrammetry the majority of the auxiliary data obtained (found in the second file) takes the form of angles, distances and geodetic elevations measured. In compiling a project file under the above one would expect to find the following items included:

- a. project diary sheet – tabulating the evolution of the field and office work as the project progresses;
- b. diagram, indicating the layout of the following types of stations –
  1. traverse
  2. camera
  3. auxiliary stations around the object of interest;

- c. photographs or hand drawn sketches of the control points that will be used to orient the photogrammetric models;
- d. tabulated sheets containing the necessary information (angles, distances) measured on site to allow the computations of the co-ordinates of (1), (2) and (3) in b. above along with similar information to calculate the co-ordinates of the control points as identified in c. above;
- e. levelling sheets – used to derive geodetic elevations along with the description and elevation of the nearest geodetic monument;
- f. tabulated sheets to document all aspects of the photography;
- g. plans, specifications, photographs, etc. of the site provided by the client or obtained by means of a site visit; and
- h. tabulated sheets containing the calculated three dimensional co-ordinates of the following:
  - traverse stations
  - camera stations
  - auxiliary stations
  - control points.

#### 4.3.4 Fieldnotes: Other

A fieldbook is a record produced in the field that consists of precise measurements regarding the structure in question. It is essential to consider the manner in which the recording will be done and the value of the fieldbook. The structure could be altered or destroyed at any time in the future. Depending on the uniqueness of the structure, this could result in an irreversible loss, unless the detailed records are complete and clear.

#### 4.3.5 Description

Fieldnotes, being the initial record produced, need to be of a certain quality to prevent future problems that could be encountered at a later date in the office. Whether the fieldnotes are for hand recording, mono-photogrammetry or stereo-photogrammetry they should all meet the following guidelines.

##### “Do’s”:

- use standard issue sheets
- record in pencil
- fill in all title blocks
- make a table of contents
- stipulate method used in recording
- make plenty of legible notes
- have proper cross-referencing
- provide a simple breakdown of the structure to be recorded
- record to scale for easy checking (details).



Sussex Dr., Ottawa, ON  
Mono-photogrammetry Mosaic

“Don’t’s”:

- use ink in case you have to erase
- use colour pencils because there will be no difference in linework when photocopied
- overdo the amount of details (ex: shingles on roof plans).

Wall elevations should be numbered on the plan and then recorded by noting such things as traces on the wall of previous walls, doors or windows, etc., colour of paint, wallpaper, pattern of nails, water seepage, etc., all of which make up a complete picture of the structure. The scales to be used are normally 1:50 or greater for plans and elevations, and full size for hardware and mouldings.

When dealing with mono-photogrammetry the fieldnotes will consist of key plans on which camera and target stations are located. The distance between them is recorded since it is relevant to proper enlargements which is critical when assembling the mosaics. A wall elevation is also to be drawn to indicate heights between targets. All other hidden details are hand recorded to produce a complete record. All surveying is recorded in table form and has to be well cross-referenced. Contact sheets of the rectified prints should be included with the fieldnotes. They will permit better understanding of the sketches. The stereo-photogrammetric fieldnotes are quite different in nature from other types of fieldnotes. They consist mainly of tables rather than detailed drawings.

The forms are the following (see examples):

- a. Leveling Form
- b. Intersection Record
- c. Polar Method
- d. Horizontal Direction
- e. Camera Forms.

There is also a list of office forms that become fieldnotes once filled. They are:

- a. Photogrammetric Plotting Data Form
- b. Final Co-ordinates
- c. Horizontal Transformation
- d. Intersection Calculation Form (see examples).

The only sketches produced (and other times photographs) are the surveying control points. All fieldnotes are to be sent to the responsible officer for proper handling and storage of documents.

#### 4.3.6 *Finish Drawings*

The finish drawings are the result of careful recording, surveying and drafting. They are produced on “B1” format paper with the designated title block. They can either be in ink, ballpoint or a photographic process. They will vary in precision depending on the means used to produce them. In any case the accuracy is to be noted in the note column. The product can vary from simple line drawings to perspectives to rectified elevations of structure to detailed presentation of a structure with deformation accentuated with profiles.

Here is a breakdown of several main components of the finish set of record drawings.

#### 4.3.7 *Description*

All of the finish drawings are to be of a high calibre. They are to be produced on “B1” format stable paper in ink for it to remain in good condition over the years. The ink also permits better quality microfilms. It has been set as a standard that a border should be provided between the drawing and the sheet’s border together with a scale. This will help in having well balanced, clean and clear drawings that can be reduced to scale photomechanically. A note column is also to be provided either on the right hand side of the page or at the bottom. Flexibility is left to the responsible officer due to the fact that different projects may or may not permit this practice.

#### 4.3.8 *Cover Sheet*

##### a. Introduction:

It has to be clean cut, simple, and representative as well as informative. As the first impression is so important, the cover sheet has to be of top quality. A photograph should normally be used instead of a perspective or a plain title sheet because it is cost effective, gives more detail and is closer to reality.

##### b. Description:

Pick an angle that represents what the structure is all about. The use of a large format camera is an advantage because of better definition on the negatives.

The use of a filter to accentuate clouds, etc., is quite permissible. When composing your cover sheet keep in mind what you will do with your titles. Where will they be? How big? See the examples shown and keep your mind open for others. The size of the lettering is left to discretion so that flexibility can be obtained in titling the sheet.

The following information should appear on all title sheets:

- name of the project
- location
- month and year of a recording
- type of record
- name of team members.

The language used on the cover sheet depends on the request.

#### 4.4 INDEX, LEGEND AND KEY PLANS

##### a. Introduction:

This record should contain all the information required to understand the symbols used in the set as well as the standards established. The user should be able to locate the site easily by looking at the key plans as well as pinpointing the site within the urban or rural area where it is situated. Name of building and street number are important data. If one can explain in a short paragraph how to get to a remote site the information may be useful. Also, if proper titling and indexing have been done any sheet can be located by glancing at the index. This sheet should appear in every set of drawings to avoid any confusion in the use of symbols.

##### b. Description:

As indicated in the title, there should be an index, with room left for additional sheets that could be annexed to the set, a legend, a reference to all standards and one or more location plans which must be kept simple but accurate and informative.

##### 4.4.1 Site Plan

##### a. Introduction:

The site plan has a lot of information of importance to the restoration team. It may provide an indication for the archaeologist of where to dig, of drainage patterns for the engineer, of traffic flow around the complex for the landscape architect, and of the interrelationship of various buildings for the historian. If a site plan is not available to the contractor through Energy, Mines and Resources or through a local surveyor's office, a site plan will have to be drawn.

##### b. Description:

When other site plans are available, produced by a reputable organization, there should be no hesitation in using those products if permission is granted; they will save extra work.

##### 4.4.2 Floor Plans

##### a. Introduction:

Floor plans of any structure are important drawings. They give an understanding of the structure, the flow of traffic and the options in terms of what to do with it. Drawings should be precise and complete. The following information should be found in a typical set.

##### b. Description:

All plans should locate the following items if they appear:

- stairs
- fireplaces
- doors and windows
- baseboards
- materials used
- electrical outlets
- heating ducts
- plumbing
- previous openings in floor or walls
- traces of water seepage
- all other information relevant to the project requirements.

c. Other aspects in elevation that should be noted or cross-referenced to a detail are: hardware, wood samples/mouldings, structural details and insulation. Elevation of the floors is also important. They indicate what movements have occurred in the structure and may be helpful in forecasting future movement or the amount of work required for restoration or renovation. Plans are usually drawn at a scale of 1:50 or larger.

##### 4.4.3 Elevations

##### a. Introduction:

The shell of the structure is important because it indicates to the person using the set of drawings the condition and appearance of the resource.





Site Plan

## b. Description:

The exterior elevations should cover such things as overall sizes (height and width), doors and windows, the materials used, their condition, the relationships to grade, the offsets and reference details of verandas, dormers, chimneys, and trim. The drawing should not go to the level of indicating every piece of siding, every shingle, every window if they are typical, etc. Simple notes to this effect are sufficient. The elevation can be a line drawing or a rectified photograph depending on the information required. Either way they are both treated alike. The rectified elevation has some advantages over the line drawing inasmuch as you can see the exact texture and condition of the elevation. Special care has to be taken when taking the photographs of the elevations and the process is usually applicable only to fairly flat façades.

## 4.4.4. Section

## a. Introduction:

This sheet acts as a tie between all other elements of the structure. It helps the user visualize what is happening and what the relationship is between the elements. The section should be free of horizontal dimensions and should tend toward the artistic aspect of drafting.

## b. Description:

Sections through any type of structure should have the following information to be complete:

- deformation in the floors, ceilings, walls, door openings, window frames and roof
- wall elevations including the material used
- floor to ceiling heights as well as other pertinent heights
- grade line and slope of grade for water runoff
- other pertinent data that would lead to a better understanding of the structure.

Sections produced by photogrammetry are free of dimensions since they are very accurately drawn to scale. The only controls to appear are the crosses around the building that can be joined to produce a grid from which one can get dimensions.

## 4.4.5 Doors and Windows

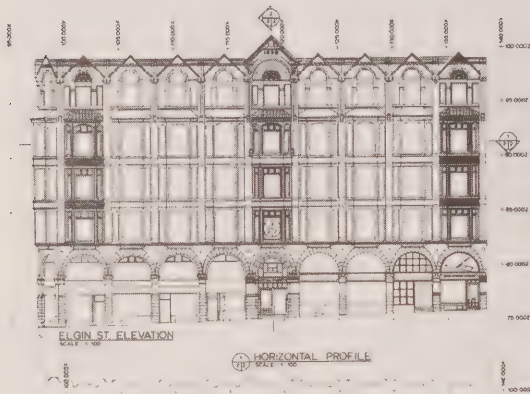
## Introduction:

The presentation format should include the exterior elevation, followed by a vertical section through the component, and then the interior elevation. A horizontal section should appear underneath the exterior elevation and larger scale details of the head, jamb and sill should be drawn on the



right hand side of the page. Full-size profiles should be drawn of mouldings, stiles, jambs, muntin bars and any other trim that are part of the unit.

If they are produced by photogrammetry, whatever information presented will not be accompanied by dimensions but will be produced to scale. When using photogrammetry in these instances, a fair amount of hand recording will be required to have a complete record. Such things as full size mouldings and hardware can be recorded by photogrammetry but a hand record is usually more economical.



Presentation Format: Windows

#### 4.4.6 Stairways

##### a. Introduction

Stairways are as numerous and different in type as doors and windows. Sometimes there is a great amount of detail in balustrades; others are very simple. Important aspects to record are:

- horizontal and vertical layout
- run and rise
- mouldings under nosing
- nosing detail
- balustrade
- stair opening
- construction detail (assembly).

The techniques used to record the stairs will be dictated by their complexity and the amount of detail required.

##### b. Description:

The sheet layout for this type of drawing can be as varied as the types of stairs. As long as the steps described in the introduction are met, the record will be complete.

#### 4.4.7 Fireplaces

##### a. Introduction:

Fireplaces are a major detail in any structure due to their size. Many historic fireplaces are garnished with detail and are impressive in appearance.

##### b. Description:

The sheet layout of the fireplace record will vary. Simply balance the sheet and provide the following information:

- structure around the fireplace and chimney
- cracks which might indicate movement of the building
- fireplace surround and mantle
- traces of previous hardware
- flues and condition of the chimney
- any other aspect that will be of importance in the renovation or restoration of the fireplace.

#### 4.4.8 Structural Details

##### a. Introduction:

Due to the many differences in construction methods no two buildings are built exactly the same. Structural details are therefore recorded for posterity as well as for the conservation team. A common way to record construction details is to do exploded views or isometrics. They are easily understood when presented this way. Framing details should be enlarged, dimensioned, and peculiar treatments should be noted.

##### b. Description:

All of the above drawings are usually drawn at scales of between 1:20 and 1:5. There is no special layout required as long as the information is complete and clear.

#### 4.4.9 Hardware

##### a. Introduction:

These are components of a building that can be recorded easily and are a simple and good source for cataloguing. Hardware is almost always required in restoration. There is often a need for comparative studies and for shop drawings to be made. Great care should be taken in the recording of hardware items.

##### b. Description:

Due to the importance of these components, they are recorded full size by such means as profile gauges, tape measures and calipers. If flat, they can be recorded by scale-recorded photography. They are drawn or printed within a ISO

"P4" format, 215 x 285 mm to facilitate cataloguing. Make note of sizes, thickness, materials and make or identification marks. A graphic scale should appear on each sheet of details for reduction purposes. The 215 x 285 mm size is convenient for duplication.

#### 4.4.10 Mouldings

##### a. Introduction:

Mouldings are a detail by themselves and can be found in almost any type of structure. This is why the approach has been used of recording all typical mouldings in each structure, to develop a catalogue. In this manner a piece of history is preserved and duplication is made possible.

##### b. Description:

Mouldings are usually recorded with the use of a measuring tape, profile gauge and calipers. The moulding should be recorded without paint to get a true profile. It is then drawn full scale on the standard sheet of paper in a 215 x 285 mm format or multiple that will permit easy cataloguing.

### 4.5 PHOTOGRAPHIC KEY PLANS

##### a. Introduction:

The photographic key plans are used within the set of drawings to identify, locate and give the orientation of the various photographs that were taken in and around the structure. They help the reader to visualize the site.

##### b. Description:

The key plans are usually copies of the plans of the structure with camera symbols, as described in 4.2 (Standards) located in the approximate location of the camera. Special care should be taken when drawing the camera symbols in making sure that the proper symbol is used (lens looking up, horizontally or down). If any grids or other lines intersect with any of the camera stations, they should be erased to ensure legibility of the numbers within the camera symbols.

### 4.6 PHOTOGRAPHIC REPORTS

The photographic report is a part of the heritage record and is useful to the conservation team because it provides information concerning texture and details of materials assembly, condition, etc., that are difficult to draw with exactitude. The photographs also provide information on related elements in the near vicinity

that otherwise would not appear in the record. They complement the information in the set of measured drawings.

#### 4.6.1 Description

The photographic report is a binder filled with various photographs concerning the structure in question. Accompanying the photographs are detailed descriptions as well as a key plan showing the location where the photographs were taken. The reports vary a little in their presentation but all should include the following:

- a. 215 x 285 x 25 mm binder (thickness can vary depending on site or project);
- b. all sheets in sheet protectors;
- c. all photos in photo holders or held down with proper photo corners and then covered with a sheet protector;
- d. 15 mm white adhesive circles to identify the photos;
- e. a metal clip at the back of the binder with the following information:
  - the name of the project
  - location
  - year of record
  - number of copies
  - number of volume;
- f. a cover sheet, possibly a photo of the structure, with such information as:
  - Branch, Division and Section
  - name of project
  - location
  - date of recording;
- g. a brief description of the structure as well as the approach and problems encountered with the job;
- h. black and white photographs unless otherwise specified by client. The format will vary depending on the type of record and the tools used (when using colour in detail shots, a colour chart should be used); and
- i. quarter-size reduction of the photo key plans, and measured drawings at the end of the report.

There are various parts to a photographic report, namely the:

- a. Hand Recording Photographic Report
- b. Mono-photogrammetric Photographic Report
- c. Stereo-photogrammetric Photographic Report.

The aims of each type of report are as follows:

- a. Hand Recording Photographic Report to include such photographs as:
  - general site plan around the structure

- exterior elevations
- details on the exterior elevation such as main door, cornice, chimney, porches etc.
- general interior views to communicate the style and condition of the structure
- interior details such as fireplaces, stairs etc.
- hardware
- structural details in basement and attic.

Note: The general views should not have a scale in them but the details should. The report should allow a conservation team to discuss any aspect or component of the asset by viewing the report in the office.



MATTER'S LOG HOUSE.  
Lakefield, Quebec.  
Summary Record  
October 19th, 1979.  
HCMLH 79 / H14

HERITAGE RECORDS  
1000-1000-1000  
1000-1000-1000  
1000-1000-1000

#### *Photographic Report Cover Sheet*

#### b. Mono-photogrammetry Photographic Report to include:

- contact prints of the rectified areas
- general photographs to relate with the site
- other hidden details that do not appear in the rectified prints
- key plan showing location of camera and target stations.

#### c. Stereo-photogrammetric Photographic Report

Written descriptions as to the scope of work, the final results obtained, a description of photogrammetry with a breakdown that describes rectified photography and stereo-photography, notes on the request for recording and a legend describing the camera symbols and camera position. The stereo-pairs are then placed in the binder in a logical order. If additional photographs were taken to supplement the stereo-pairs, they are incorporated at the end of the report. Following the photographic section, quarter-size reductions of the drawings produced photogrammetrically are annexed at the end of the report.

Over the past years all photographic reports have been compiled into a "Heritage Recording Report." This report brings together all photographic, graphic, and related textual information for purposes of effective data access and management.

#### 4.6.2 Negatives

In the process of providing basic information as an integral part of the conservation process, many photographic negatives are collected. The taking of these negatives is important in that they document the condition of the site and its many interrelated parts at a certain point in time. These negatives not only supply the information of the original intent but also provide information for various other studies. Therefore it is quite apparent that an orderly type of storage and retrieval system is mandatory.

Today, many types of negative material are available on the market. For the purpose of producing Heritage Records, black and white along with some instances of colour material are used. The formats are usually 35 mm, 100 x 125 mm, 125 x 175 mm and 60 x 60 mm. The following descriptions will define the use and sizes of negatives used in different types of records.

#### 4.6.3 Description

- For hand recording, the most common format is 35 mm because of its versatility, economy and availability. It can be processed almost everywhere and the results from commercial laboratories can be quite acceptable. Since most of the photographs used in the photographic reports are 90 x 125 mm, the need for extra fine grain for enlargements is not necessary. The 35 mm negatives are to be stored in negative protectors within a binder and the following information should appear on top of each protector:

- name of project
- location
- date of photographs
- film roll numbers.

From time to time the use of 60 x 60 mm format is more appropriate. These instances are when there is a concern for having enlargements done or when fine definition and crisp detail are required. Also when doing a stereo-photogrammetric photo report, 60 x 60 mm contact prints laid next to each other are ideal for photo evaluation. The negatives are stored in the same manner as the 35 mm negatives.

As soon as the project is done, the negatives are sent to the responsible officer so they can be filed according to Section 7.0.



- b. Negatives produced for mono-photogrammetry generally are of two sizes namely, 100 x 125 mm and 125 x 225 mm, respectively. If the rectification is accomplished using a 100 x 125 mm view camera, the recording medium is acetate film. The resulting negative is used to make an internegative and stored in a separate building for safety purposes in case the original is lost by fire, etc. All the original negatives should be stored for safekeeping and posterity.

When photogrammetric cameras are used, the recording medium is usually photographic glass plates. From these glass plates two internegatives are produced on acetate film. The original negatives are again set aside for safekeeping.

All the negatives and internegatives in acetate film are stored in the appropriate size transparent sleeves (Kodak 100 x 125 mm, 125 x 175 mm) and then placed in individual "Ph Envelopes" along with other related information. The glass negatives are stored directly in Ph Envelopes.

All photographic material is filed away and retrieved according to a file number indicating region, project name, year of recording, province and negative number.

- c. The procedures adopted under 4.6.2 of the above also applies to negatives produced through the use of stereo-photogrammetry. A few differences are apparent.

All original negatives are on glass plates. Two internegatives of each glass plate are produced. Filing is similar to that for mono-photogrammetry except that stereo-pairs are filed in the same Ph Envelope rather than individual envelopes per internegative.

#### 4.7 SUMMARY RECORD

(Previously "REFERENCE DATA RECORD")

The Summary Record consists of the relatively accurate compilation of pertinent period data on a historic site, structure and its typical components, using graphic, photographic and written means of representation.

#### 4.8 PRELIMINARY RECORD

(Previously "PRELIMINARY PHOTO REPORT")

A Preliminary Record consists of a brief compilation of pertinent technical data related to a historic site and structure using graphic, photographic and written means of representation. This type of record should permit one to be briefed on the

site location, relative condition, appearance and interior layout of a period structure. Such a record can be produced in a week (two person team) and is used generally for preliminary discussion.

##### 4.8.1 Use

This record should contain relevant data which is required for:

- preliminary discussion concerning phases I and II of the conservation process;
- the preparation of studies which deal with a series of structures that are of particular interest to the Department;
- preliminary assessment and planning by the conservation project team thus providing an inventory of built, landscape and equipment elements of a site at the time of a turnover to the Department;
- establishing a basis to determine more intensive recording work;
- the compilation of a "Takeover of a Site or Structure" file or report;
- helping the Historic Sites and Monuments Board to determine if an identified site or structure is physically suited to the illustration of its historical interest; and
- planning interim stabilization work.

The Preliminary Record is normally undertaken by specially trained experts as described under section 2.1.3. This type of record should be initiated for each new site and structure of interest to regional offices.

The following description of the record can be used as a standard or a guide so that preliminary records can also be produced whenever conservationists undertake a reconnaissance trip to an isolated site. Therefore, provision should be made within their schedule so that sketches, photographs and narrative documentation are compiled to meet Heritage Recording standards.

The extent of a preliminary survey is generally determined by the present standard (see 4.8.2) unless additional requirements are identified at the time of request.

##### 4.8.2 Description

The Preliminary Record is produced using the same techniques to produce an end result similar to the subsections described in 4.3. In many cases, the preliminary record is composed mainly of photographs with a key plan with overall dimensions. This information may suffice and if further recording is required it

can be requested using the standard "Request for Heritage Recording" form. Often the product produced in the field remains in fieldnote form, thus demanding clear fieldnotes.

#### 4.9 AS-BUILT RECORD

An As-built Record consists of up-dating conservation design drawings by using graphic, photographic and written means of representation. This type of record allows one to identify changes made to working drawings during the course of the Conservation Project Implementation (e.g. Phase IV of the Conservation Process). It is generally used as reference for maintenance and future conservation, and other works.

##### 4.9.1 Use

This type of record contains relevant data required for:

- a. establishing a precise maintenance program which follows the conservation implementation;
- b. the preparation of studies of a comparative nature; and
- c. for general reference and posterity.

Generally, this type of record is produced during the course of the conservation project implementation phase of the conservation process. The extent of this type of record is determined by the amount of changes or modifications made to the working drawings. This record is produced under the supervision of the restoration architect or engineer and compiled by local draftsmen or the equivalent, using the following description as a standard.

##### 4.9.2 Description

An As-built Record is produced using the same standards as described in 4.2. A photo report also accompanies the drawings and the standards conform with those established in 4.6. Duplication of information should be avoided and the incorporation of new working drawings into the set of drawings or a note to the effect of their location is quite acceptable. The same format and sheet arrangement as described in 4.3 is to be respected.

#### 4.10 FOLLOW-UP RECORD

Heritage Recording should be undertaken before, during and after any intervention to an historic asset takes place. A Follow-up Record consists of ensuring that each completed heritage record in existence is updated when additional pertinent data is made available.

This aspect of recording has been identified with the knowledge that the recording process often requires information in addition to that obtained during the main recording activity. The essential points of Follow-up Records are that they represent an extension or modification of previous work and that they can apply to any of the four levels of recording described previously. As such, information which comprises Follow-up Records should be referenced as a supplement to the main heritage record package.

Records describing or illustrating stabilization, alterations, and other changes to historic structures are examples of Follow-up Records. After-stripping records, maintenance records, and monitoring records are considered this type of recording, where preliminary or complete detailed records are normally used as their base or reference source.

##### 4.10.1 Use

This record, as the name implies, is to supplement other records and, in doing so, provide important additional information which is not a part of the original record. This additional information often adds the dimension of time to the recording process and thereby allows the main record to stand unaltered, with the historic structure "frozen in time." By the use of Follow-up Records, rather than total alteration of the original record, two goals can be achieved — the original archival "frozen in time" record can be maintained in addition to the everchanging record which represents the actual or latest observed conditions of the structure.

A great deal of information can be provided in the Follow-up Record as it should include the following:

- a. new information obtained from comprehensive structural or fabric monitoring programs, such as fluctuation of moisture content or structural movement studies;
- b. new information obtained during the installation of services or utilities, or during a stripping program of historic fabric;
- c. progress of maintenance work and of continuing conservation (e.g. Phase VII of the Conservation Process);
- d. portions of a historic site or structure which were left out of the original recording process due to inaccessibility, financial or other reasons; and
- e. additional data made available during intervention to a structure.

The Follow-up Record was developed as a means towards flexibil-



ity in heritage recording. However, past experience from departmental recorders as well as conservationists that have been involved in the conservation of many historic sites and structures, shows that there are advantages in producing complete, detailed records at an early stage of the process. Incomplete records can imply the following:

- a. the conservation project team experts must themselves collect the missing information at a later date, which may be costly and time consuming;
- b. the information collected by the conservation project team may not be on par with the accuracy of departmental recording standards and may also be lost if not dealt with systematically;
- c. the difference in costs between producing a full record at once and producing a record in phases is high due to logistics and time consumption; and
- d. in the event of destruction, invaluable period data is lost forever.

#### 4.10.2 Description

The Follow-up Record is in fact a partial Complete Detailed Record. It follows all established principles and standards that were kept in the previous set (unless otherwise stipulated).

## 5.0 ARCHAEOLOGICAL RECORDS OF SITES, DIGS, REMAINS AND ARTIFACTS

### 5.1 INTRODUCTION

Archaeological records of sites and digs are normally produced during either phase II or III of the conservation process. However, in some cases these sites can be recorded independently from a complex conservation process activity, under the direction of the responsible archaeologist.

Because of the particular nature of archaeological research, this type of recording is to some extent different from the other types described under 4.0, even though it has similarities with them. The level of accuracy and detail found in archaeological record drawings is comparable with that of a Complete Detailed Record. However, graphic representation of the information is somewhat different due to the research work which deals with below grade data.



*Recording An Archaeological Site*

In any of the above cases, archaeological recording is initiated by the responsible archaeologist in consultation with the conservation team when applicable. This is done separately from other recording requirements which could be undertaken simultaneously at the same site, with the understanding that overlapping information to both aspects of recording activity are identified, and duplication of efforts is avoided. In this case, both records are cross-referenced to one survey system.

### 5.2 DESCRIPTION

The archaeological record is produced on "B1" format paper and all of the standards previously described in 4.2 are to be respected. Extra symbols exist for archaeological recording.

### 5.3 ARCHAEOLOGICAL RECORD

An archaeological record consists of assuring extremely accurate compilation of pertinent data related to the archaeological site, digs, remains and artifacts, using graphic, photographic and written means of representation. As with the complete detailed record (4.3), this record could permit, in the event of destruction, study, and if required, the possible reconstruction of the site, remains and artifacts, as they were found at the time of recording.

#### 5.3.1 Use

This record should contain relevant data required for:

- a. planning;
- b. producing displays on archaeological research projects within Departmental interpretation centres or at other locations;
- c. the preparation of illustrated archaeological research project reports;
- d. the research study of an archaeological site, digs, remains and artifacts; and
- e. future reference and posterity.

The extent of the record is determined by the archaeologists at the time the "Request for Heritage Recording" is initiated. Provision should be made to cover additional requirements as unexpected features are often discovered.

The archaeological record should be supervised by the site archaeologist using experienced heritage recording experts to ensure efficient recording and proper high standards of graphic interpretation of archaeological data.

## 6.0 OTHER TYPES OF RECORDS

In previous subsections, emphasis has been placed on specific types of heritage records that have been developed and produced to date by A&ES as an integral part of the conservation of historic sites, structures, and remains. However, other small individual research projects are being undertaken by various departmental conservationists and require in some instances accurate technical records as supportive material to their studies.

4.0 and 5.0 above should be used as a basis for representing the recording related to any individual project. If the project in question relates to any historic resource at which heritage re-

cording was undertaken, the record will then be identified as part of a follow-up record. If not, it will be dealt with separately with appropriate identification and stored within the heritage recording collection for reference and posterity.

Many applications of state-of-the-art recording techniques currently being used by photogrammetric and specialized recording experts are still to be explored, and proper experimentation could prove to be extremely valuable to conservationists. For example, questions as to how to accurately and efficiently record a shipwreck underwater or "one of a kind" artifacts before conservation treatment or a large structure when short notice of demolition is given, can be answered by the use of photogrammetry.

Other types of heritage records are produced by Heritage Recording and Technical Data Services of A&ES (EC) and by other international agencies which have a similar mandate. Examples of specific recording techniques and the potential uses of sophisticated recording tools used by experts are available upon request to R. Letellier – see 7.0.

There are other non-destructive recording tools that exist (i.e. industrial radiography, holography, infra-red and ultra-violet recording, etc.) and should be at the service of conservationists. These are considered by heritage recorders as part of future heritage recording requirements.

## 7.0 HERITAGE RECORDING COLLECTION

Heritage records produced to date by A&ES are considered part of the Department's Heritage Recording collection. All new heritage records should be collated and indexed to become a part of this collection. For information on the proper procedures, contact HR & TDS of A&ES (EC) in the appropriate region:

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# **VOLUME II**

# **HERITAGE RECORDING**

## **4**

# **INCORPORATING PHOTOGRAPHS INTO TECHNICAL DRAWINGS**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
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ORIGINAL DRAFT: C. POTVIN AND L. FARDIN



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## 5.0 APPLICATIONS

## 1.0 INTRODUCTION

This section describes the use of photographs to complement or enhance technical drawings made for projects undertaken by Architecture and Engineering Services for Canadian Parks Service. In projects involving, for example, restoration, drawings alone are insufficient for illustration. When available, photographs are invariably the preferred means of conveying an accurate idea of the appearance, character and historicity of the setting (in whole or in part). Photographs can also be used in development concepts; deductive analyses; site, visual, and historical analysis; surveys of sites or buildings; and illustrations of construction details.

### 1.1 SCOPE

This section is intended for architects, engineers, landscape architects, and technicians engaged in period or contemporary projects. It briefly describes the half-tone process used to reproduce photographs on current xerographic copiers, printing presses, and diazo machines; the selection, handling, and preparation of various types of photographs in technical drawings; various methods of mounting photographs; and applications of photographs incorporated into technical drawings.

### 1.2 DEFINITIONS

**Polyester Film:** high-grade, archival-quality drafting film, such as Cronaflex, Translar or Herculene.

**Drawing Sheet:** a preprinted drafting sheet on which photographs and drawings are to appear.

**Half-tone:** a printing process; the tones of a photographic image are composed of numerous dots rather than solid masses containing continuous tones of grey.

**Photograph:** a reproduction of a continuous tone image, including copies of photographs, plans, paintings, sketches, or engravings showing details of a site, building, or any other item that is the subject of an A&ES project.

## 2.0 HALF-TONE PROCESS

Because current xerographic copiers, printing presses, and diazo (white-printing) machines normally print only the black and white of photographs and not subtle shades of grey, any photograph reproduced by these means will be blurred and lacking in resolution of details. Most photographic reproduction is en-

hanced by preparing a printing plate whose results appear similar, but whose technology achieves greys by printing with small dots of black and white.

By rephotographing the original photograph through a mesh or screen, the original continuous tones of the image are broken into a regular pattern of black (or white) dots of varying sizes.

Screens, depending on the application, are printed with various numbers of "lines" of dots per centimetre when measured on the diagonal. The higher the number of lines per centimetre, the truer the resolution of details will be. Thus a screen of 130 lines per centimetre is used for reproductions on high quality paper in books and magazines, and a standard screen of 80 to 100 lines, for reproductions in the form of xerographic copies or white-prints.

Half-tone screens can also have various non-dot patterns such as concentric circles, wavy lines or hachures. These screens are mainly for special effects and are not used frequently.

## 3.0 SELECTION, HANDLING, AND PREPARATION OF PHOTOGRAPHS

### 3.1 SELECTION

The following points should be considered when selecting photographs for half-tone reproduction:

- a. For the half-tone to be true to the original, the original must be of the best quality possible. The half-tone process will not improve the quality of the original.
- b. The original photograph should preferably have a smooth, glossy finish as opposed to a matte finish. A glossy finish tends to polarize tones to either black or white, thereby rendering a sharper image. A matte finish produces less contrast between black and white tones, thereby producing a lower quality image.
- c. The relevant details of the original should be clear and sharp, otherwise the image reproduced will be of poor quality.

### 3.2 HANDLING

Because pencil or pen marks are likely to be embossed into the emulsion of a photograph, which is very soft, and reproduced as highlights and shadows on the half-tone, do not write unnec-

essarily on the original photographs. Handle by edges only, to avoid fingerprints on the original. Fingerprints and grease can reproduce.

### 3.3 PREPARATION

Prepare photographs as follows:

- a. Examine the details of each original image carefully. When ordering half-tone negatives, consider having the original "cropped" to exclude non-essential details and enlarged to emphasize important details.
- b. If panoramic shots are required, have as many photographs taken as are needed using a camera mounted on a tripod and pivoted on an axis parallel to the horizon. Have the negatives printed and assembled in a strip. Cut away excess and tape the backs of the photographs together with transparent tape to recompose the panoramic view.
- c. Prepare captions and/or legends for each photograph on the drawing sheet. Include credits (details on the provenance of each original: source, date, and so on). Obtain permission to reprint, when necessary.
- d. Using drafting tape, fix the half-tone to the front or "good" side of the drawing sheet in the outlined location. Taping will prevent movement while cutting.
- e. Turn the drawing sheet upside down and tape it to a flat surface. Preferably use a light table, as the blue outline on the drawing sheet clearly shows up on the lit surface. With a sharp tool such as a cutting knife, cut out windows the exact size of each half-tone in the location desired.
- f. Carefully remove the cut out section(s). Without disturbing the drawing sheet or the half-tone, tape each half-tone in the proper window, using high quality transparent tape. TRIM TAPE NEATLY.
- g. Turn the drawing sheet over and carefully remove extraneous materials such as drafting tape and half-tone edges.
- h. Using ink, draw in annotations, directional arrows to details, and write in labels. Also add any other graphics to the sheet at this time.

Although this method is initially less expensive and relatively quick, it has several disadvantages and should be used as a temporary measure only. The tape loses its adhesion after a year or two, resulting in half-tones becoming dislodged or lost. Direct copies on polyester film, digital computer copies, or micro-form copies should be used to give this type of temporary drawing sheet archival permanence.

## 4.0 MOUNTING

Half-tones may be mounted on drawing sheets in several ways. The method selected will be determined by costs, needs, the quality desired for the project, how long the drawing sheet is to be kept, and so on. The first method is simple, cheap, and suitable for short-term applications. The second is somewhat more time-consuming, but suitable for long-term applications. The third method is more costly but produces best quality results. When extensive text is used in combination with the photographs, this one takes less time than the other methods.

### 4.1 SHORT-TERM MOUNTING

- a. Select and prepare photographs as described in 3.0.
- b. Order negatives developed as half-tone screened positives printed on polyester film rather than on photographic paper. High-grade polyester film yields better results than even the best high-quality tracing paper (vellum).
- c. Obtain a polyester film drawing sheet. Prepare the drawing sheet as follows. Assign a space to each photograph. This space is usually slightly smaller than the half-tone. With a non-reproducible blue pencil, outline the four sides of the section of half-tone used to facilitate accurate cutting.

### 4.2 LONG-TERM MOUNTING (MEDIUM QUALITY)

- a. Select and prepare photographs as described in 3.0.
- b. Order half-tone negatives of the size required in the final drawing.
- c. If not already on hand, order a general-purpose ortho-negative of the drawing sheet. This type of high-contrast emulsion will print either black or white (clear) without grey tones and with crisp edges to lines and lettering on the final drawing sheet.
- d. Assign a space to each photographic negative and mount into a sheet of masking cardboard corresponding

to the interior of the drawing sheet (see 4.3 f.- for more information on method of mounting negatives). Negatives can also be mounted by the printer at a normal labour charge.

- e. Have a positive developed on polyester film in the required size. Add all notes and other graphics as for a normal drawing sheet. Normally, the emulsion is on the reverse (back) side of the sheet so lettering can be super-imposed over the printed half-tone images and erased (or washed off) without damage to the half-tone itself (it may be wise to confirm that the printing will be on the back of the sheet).

This method can employ any combination of half-tone images mounted into a general purpose ortho-negative sheet. Since notes, titles, and other graphics will be applied later, alignment time, photographic costs, and preparation work can be kept relatively low.

#### 4.3 LONG-TERM MOUNTING (HIGHER QUALITY)

- a. Select and prepare photographs as described in 3.0.
- b. Prepare a paste-up using a standard size drawing sheet and mounting photocopies of the original photographs and text. Adjust the layout and reduce, enlarge or trim the material to obtain the best effect. The paste-up is your guide as well as the printer's.
- c. Prepare the actual drawing sheet as follows: assign a number to each photograph; carefully write this number on the back of the photograph; using non-reproducible blue pencil, trace an outline of each photograph on another drawing sheet of polyester film or vellum paper; and number the spaces accordingly.
- d. With the paste-up as a guide, position lettering for labels, directional arrows, and ink drawings on the drawing sheet. Use any type of lettering, as long as it is clear and readable, even if reduced. Lettering may be applied in any of the four ways described below:
  - Typeset text: Cut out the texts and position them on the drawing sheet. Using non-reproducible blue pencil, trace guidelines to show where texts are to be affixed. Apply glue or hot wax to the backs of the text and fasten into place. Hot waxing is the most desirable method, because the adhesive does not dry immediately, and the texts can be shifted around until the desired effect is achieved.

- Transferable lettering: This method employs letters placed on a carrying sheet. Position the letters where desired on the drawing sheet and transfer them directly to it by rubbing. (Transfer lettering is very fragile.)
  - Typewriter text: Treat the same as typeset text.
  - Hand-lettering or Electronic Scribe: Work directly on the drawing sheet. Use ink rather than pencil for best results.
- e. Once lettering and any drawings have been added, order a negative full-size ortho of the entire drawing sheet and half-tone negatives of each photograph.
  - f. Normally the reproduction company splices the half-tone negatives into the ortho-negative before printing the positive. If they do not prepare the spliced negatives, one can obtain a sheet of masking cardboard (red, amber or white) the same size as the drawing sheet. Lay the drawing sheet on top of the cardboard and, cutting through both layers, make windows for the photographs drawn on it. Turn the cardboard over and insert each negative in its proper place, fastening each to the sheet with red adhesive tape (the red tape is photographically opaque and provides a sharp border around each photograph when the positive is shot). The final result is a large composite negative.
  - g. Have a final positive developed on polyester film in the required size. This positive is obtained by shooting the negative of the drawing sheet (described in e.) and the half-tone negative containing the pictures (described in f.) on the same polyester sheet. On this positive, text, drawings, and photographs must be aligned perfectly.

#### 4.4 NOTES ON HALF-TONE ILLUSTRATIONS

Because it can be difficult to read written notes when printed directly on dark areas of photographs, the areas where the text is to appear can be masked on the negative of the photograph. The white background thus produced makes it easier to read the text. A similar effect can be achieved in reverse by writing directly on the negative with ink. By positioning the notes on the lighter or clearer areas of the negative, the final positive drawing will contain crisp white lettering superimposed over the dark screened areas.

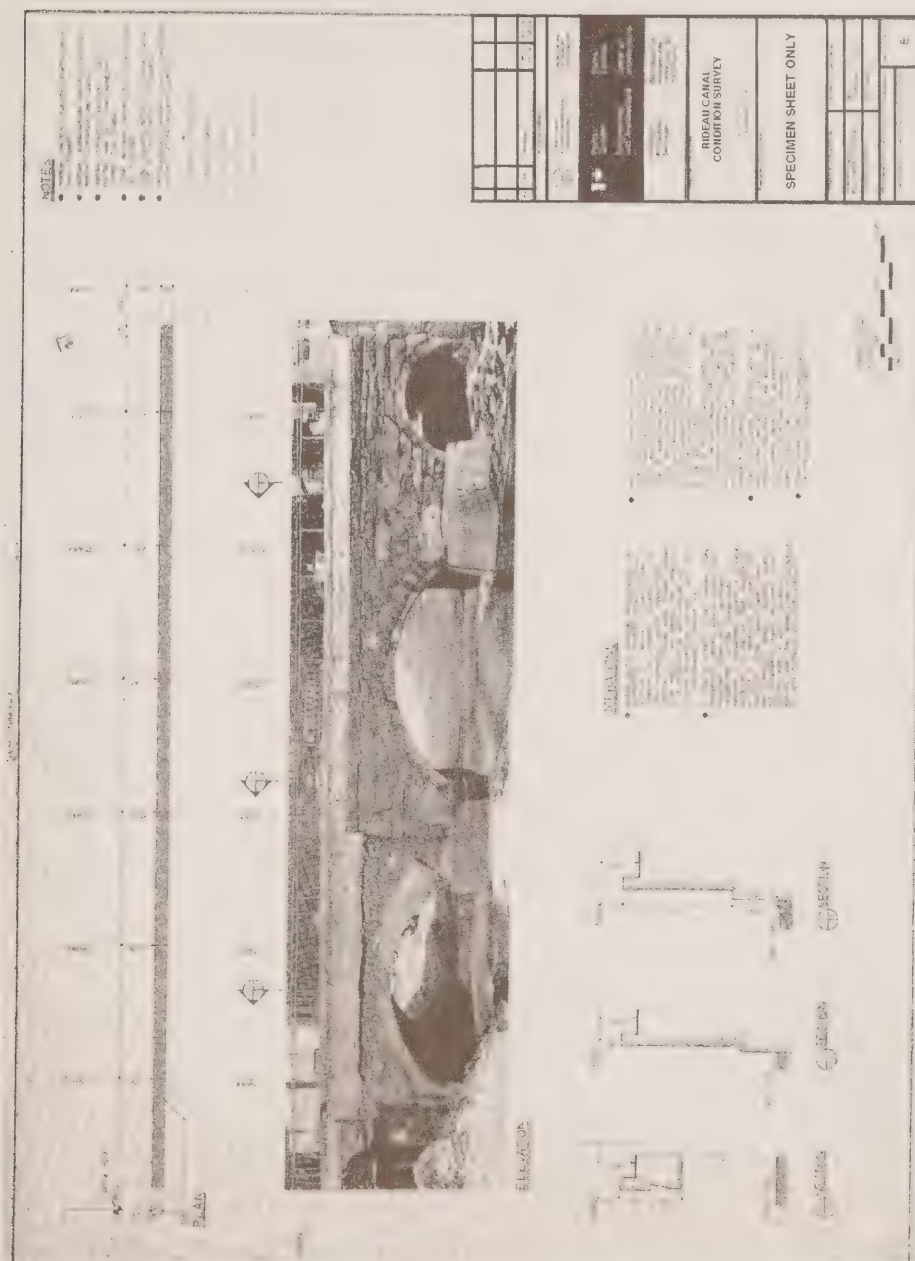
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## 5.0 APPLICATIONS

Various types of photographs can be used to good effect in technical drawings. In landscape projects, for example, an aerial photograph may be more effective than a conventional plan for a large complex site, because it gives an overall view of the context and details of the landscape. The same aerial photograph can be used to analyze various aspects of the site such as settlement patterns, land use and circulation networks for any given period or to illustrate a master site development plan. Panoramic photographs facilitate recording extant conditions: visual characteristics of a landscape such as vistas and desirable or poor views, may easily be communicated by this means. Period photographs may be incorporated into a drawing sheet to illustrate construction details. They may depict a period detail or be integrated with a construction detail.

*Illustrations are the property of the Heritage Conservation Program, unless otherwise noted.*





## Technical Drawing with Photographs











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# ARCHITECTURAL CONSERVATION TECHNOLOGY

## VOLUME III HISTORIC SITE ANALYSIS

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
OTTAWA



Canadian Heritage  
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Group	Canada
Publishing	Édition



# **ARCHITECTURAL CONSERVATION TECHNOLOGY**

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OTTAWA

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**NOTE:** Since this manual was in production when federal government departments were restructured in 1993, it was impossible to update all in-text government references. The Canadian Parks Services (CPS) of Environment Canada is now Parks Canada of the Department of Canadian Heritage, and Public Works is now part of the Department of Government Services.

**I**ncluded within the seven volumes of the ACT manual is both basic and specialized information on architecture, engineering and landscape works.

References at all levels within these disciplines, useful both in practice and in training, are intended to:

- introduce and familiarize the user with conservation concerns;
- serve as an "aide-mémoire" at both the design and managerial levels; and
- provide guidance to professional consultants responsible for recording and analysing historic structures, and applying recommended conservation methods to their protection and preservation.

All procedures outlined in these publications should be read in conjunction with the reference material, manufacturer's literature and the relevant Canadian Parks Service – National Historic Sites Management Directives.

In all matters where detailed specifications are required, such as building codes, fire regulations and the use of chemicals, the prevailing and local references and regulations must be consulted and applied.

**P**lease note that the ACT manual has been prepared within the context of Parks Canada Policy (1979). The newly proposed Canadian Parks Service Policy (1990) establishes additional and broader directions that, however, do not alter the orientation of the technical material covered. The ACT manual reflects the well established principles of conservation as defined by national and international charters and conventions – see Vol. I Appendix.

Within the proposed policy, the Cultural Resource Management (CRM) section (see Vol. I, Appendix 5.17) establishes the overall framework for the conservation and presentation of the cultural assets administered by CPS, on all CPS properties, including those in National Historic Sites, Historic Canals, National Parks, National Marine Parks, and other CPS properties. In the event of a conflict between the direction provided by the ACT manual and that provided by CRM Policy, the latter applies.

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*Architectural Conservation Technology* (ISBN 0-660-14657-6; DSS Cat. no. W62-16/1993E) is a manual of seven volumes. Each volume may be bought separately. Here are the contents and numbers for each one.

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# **VOLUME III**

# **HISTORIC SITE**

# **ANALYSIS**

## **1**

## **CATEGORIES AND LEVELS OF ANALYSIS**

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## 1.0 INTRODUCTION

The conservation of nationally significant historic sites and structures requires rigorous, well-defined studies as a prerequisite to protection, development and commemoration. These studies span many approaches and disciplines, but usually rely heavily on direct physical analysis. Such investigations and analyses can range from preliminary assessments on which general planning proposals and rough cost estimates are based to all-encompassing studies, before preparing final working drawings and specifications.

This section defines analysis from the architectural and engineering perspective and provides a basis for evaluating the various approaches to predesign investigations. Included are descriptions of the categories and levels of analysis, the information to be reported and the application of this information during conservation. This section applies to all technical investigations and examinations of historically or architecturally significant land, buildings and works held by the Canadian Parks Service (CPS).

## 2.0 ROLE OF ANALYSIS IN THE CONSERVATION PROCESS

### 2.1 DEFINITION

In general, analysis ascertains and examines a feature's essential components, characteristics and methods of assembly. It may also describe the results of such investigations by providing an overview of the subject and a summary of important findings. More specifically, it involves critical examination to elicit essential information or evidence of past and present conditions as a prerequisite for protection, site development and commemoration.

By definition, historic site analysis includes:

- a. identifying historic designs, materials, finishes, assemblies and structural systems;
- b. discovering the condition of existing materials and structural systems and the causes of defects;
- c. finding evidence in the fabric and finishes of the original form and subsequent alterations;
- d. uncovering physical evidence of past function;
- e. noting any unusual or interesting use of design, materials and structure;

- f. identifying existing landscape features and plant materials;
- g. uncovering evidence of original plantings and landscape;
- h. discovering conditions and causes of defects of landscape features;
- i. identifying environmental factors that affect conservation proposals; and
- j. noting other considerations that might affect protection, development or commemoration.

### 2.2 PURPOSES

Analysis establishes a historical and a physical perspective of a site or structure, with sufficient detail to formulate and assess suitable conservation options.

Although most analysis of historic sites and structures is project-oriented to provide information for subsequent plans of action, it can also be conducted for research and other archival purposes.



*Métis Log Building, McDowell, SK*

### 2.2.1 *Historical Perspective*

Technical investigations can provide evidence or indications of past functions, construction technology, appearance, layout, character and other information on the history of the site. This information is synthesized with related material from comparative studies and historical research of the structure to provide the best picture of the structure's past form. To a large extent, developing a historical perspective involves using the site, building or work to broaden our understanding of its history and to provide definite information on its evolution.

### 2.2.2 *Physical Perspective*

A physical perspective is concerned with existing conditions and causes of deterioration. Problems of deterioration can be divided into three types: inherent, external (of natural causes) and those created by humans.

Inherent problems are uncovered by analyzing the building elements, execution of work and methods of assembly. External problems are revealed through investigation of climatic and other environmental problems such as biological attack, varieties of air pollution, earth movement and salts. Problems created by humans extend to all types of alterations, repairs, wear, fire, vandalism and so on.

---

## 3.0 CATEGORIES OF ANALYSIS

The analysis of historic sites and structures has been divided into six categories:

- environmental
- architectural
- structural
- mechanical/electrical
- marine
- landscape

### 3.1 ENVIRONMENTAL ANALYSIS

The identification and study of surrounding circumstances, both physical and climatic, provide a context for the other categories of analysis and are an important part of all investigations. Environmental analysis deals with patterns of land use, topography, rainfall, wind characteristics, snowfall, temperature, seismic activity and other conditions that affect a historic structure.

Environmental analysis can be carried out by physical planners, engineers, architects and landscape architects. See Section 9, "Environmental Investigation and Analysis" for more information.

### 3.2 ARCHITECTURAL ANALYSIS

Architectural analysis includes a physical examination of the architectural characteristics of any historic site or structure to determine initial and subsequent appearances, materials and finishes; and an investigation of current physical conditions.

Architectural analysis is normally carried out by a restoration architect in co-operation with technologists, conservation specialists and others. A more detailed definition of architectural analysis is contained in Section 4, "Architectural Analysis."

### 3.3 STRUCTURAL ENGINEERING ANALYSIS

Structural engineering analysis includes the investigation of the structural systems and elements of individual buildings and the general examination and analysis of period engineering works. As with most categories of analysis, it has areas of overlap (in this case, with mechanical and geotechnical investigations and architectural analysis, for example).

Engineering analysis is conducted by a conservation engineer or other engineer with experience in the detailed investigation of historic structures. See Section 5.1, "Structural Engineering Analysis: General Assessment" for more information.

### 3.4 MECHANICAL AND ELECTRICAL ENGINEERING ANALYSIS

Mechanical and electrical engineering analysis is sometimes considered part of the overall engineering analysis. It is concerned with investigating and assessing electrical, gas and water distribution services; sewage, heating and ventilating systems; and other elements of the site, vessel or building infrastructure. Although often concerned with investigating existing services for potential adaptation or renovation, it also deals with the period services.

Conservation engineers, architects, technologists or specialists may perform this category of analysis, depending on the complexity of the site and the level of analysis. See Sections 6.1, 6.2 and 6.3 "Investigation and Analysis of Site Services" and Section 7.1 "Period Machinery."



### 3.5 MARINE ENGINEERING ANALYSIS

Because of the special problems associated with investigating historic vessels, marine engineering analysis is treated separately. It covers various specialty engineering works in addition to vessels.

Stationary engineers, marine engineers and technologists specializing in restoring machines and marine structures normally conduct these detailed investigations. A more detailed description of marine engineering analysis is contained in Section 7.2 "Period Vessels."



*Public Gardens, Halifax, NS*  
Courtesy of National Archives of Canada/C17797

### 3.6 LANDSCAPE AND GARDENS ANALYSIS

Landscape and gardens analysis deals with the original characteristics, evolution and current state of the land forms, plant materials and ancillary works (e.g. fences and paths) on

historic sites. Such analysis is often tied to archaeological excavations and research.

Conservation landscape architects and technologists normally carry out this category of analysis. See Section 8 "Investigation and Analysis of Landscapes" for a more detailed explanation.

## 4.0 LEVELS OF ANALYSIS

The concept of levels of thoroughness for analysis is introduced to help differentiate the degrees of detail that can be provided during physical investigations. Four levels have been established for use in the Department when preparing physical investigations of historic buildings, works and lands. They are:

- a. Level "D" - a cursory analysis;
- b. Level "C" - a preliminary or partial analysis;
- c. Level "B" - a general analysis; and
- d. Level "A" - an exhaustive analysis.

These four levels are meant to clarify the implied degree of thoroughness and to facilitate project planning.

The four levels are not rigid; in practice they can overlap. Further, although analysis is usually conducted during the initial stages of a project, it can be carried out through the design, implementation and maintenance stages as well.

### 4.1 LEVEL "D" (CURSORY ANALYSIS)

Level "D" is an initial analysis tailored to provide an overview of the site and observations about important areas of concern. It is the least detailed level and normally involves the first physical investigation of a site. It should be succinct, but informative. It should include an inventory and description of landscape features, buildings and works (preferably by a restoration specialist) and the following is applicable:

- a. overview of structural conditions, including an estimate of the magnitude of structural problems;
- b. calculation of finish and fabric types found at the site or structure;
- c. overview of design characteristics, stressing layout, integrity and style;
- d. initial evaluation, in general terms, of structural evolution, condition and deterioration;
- e. list of available utilities and services;
- f. overview of plant materials, terrain and water and soil conditions;

- g. list of important environmental considerations (e.g. severity of climate, compatibility of neighbourhood/setting);
- h. list of warnings and related concerns related to protecting the site and conducting subsequent investigations (e.g. vandalism or unsafe electrical systems); and
- i. list of questions warranting further investigation before commitment by the Department (e.g. clarification of origin or authenticity).

A Level "D" analysis of a modest building on a small site normally takes no more than one day. Large, complex sites or structures should be divided into manageable areas for cursory analysis.

#### 4.2 LEVEL "C" (PRELIMINARY OR PARTIAL ANALYSIS)

Level "C" is a preliminary or partial analysis that consists of limited investigations designed to provide significantly more detailed information than a cursory (Level "D") analysis without the time-consuming, expensive study required for a general (Level "B") analysis.

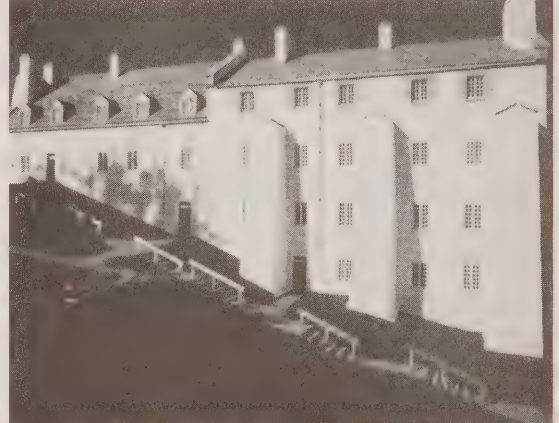
In addition to any aspects that might be preparatory to a more detailed investigation, Level "C" analysis should include:

- a. notation of structural deficiencies, including an assessment of immediacy and seriousness;
- b. list, with locations, of apparent defects or deterioration of materials, finishes, design or work;
- c. list of probable causes and effects of deterioration;
- d. notation of all historic fabric of possible interest;
- e. examination of structural and site deficiencies that could pose a threat to the historic fabric;
- f. brief description of each service or utility, including a breakdown of deficiencies that might affect safety, security, initial conservation or subsequent investigations;
- g. record of a series of monitoring references and controls for subsequent physical investigations of movement or fluctuation of ground water or earth movement;
- h. list of plant materials and an evaluation of other landscape features; and
- i. preliminary geotechnical or other specialty investigations.

A Level "C" analysis might require several days to several weeks. It should be conducted by experienced conservation technicians with, in many cases, the help of specialists (e.g. for site appraisal of soil conditions and stability).

#### 4.3 LEVEL "B" (GENERAL ANALYSIS)

Level "B" is a comprehensive, but not exhaustive, general analysis. It should provide an understanding of all or nearly all, the parts of a historic site, but is not intended to answer every question in depth.



*Redoute Dauphine, Quebec City, PQ*

A Level "B" analysis sets out to uncover and examine all physical evidence on major or contentious issues. It also includes observations from a representative sampling of other subject areas and a detailed evaluation of all building and site elements, principal components and infrastructure. Essentially, it is meant to provide an in-depth picture of the overall subject without requiring highly detailed information on every part. For example, unless the design decision calls for a certain period paint colour, extensive laboratory analysis of samples of the original layer for colour shift is not necessary.

A realistic balance must be struck to permit proper evaluation of issues while avoiding unnecessary investigations. The scope of a Level "B" analysis should be tailored to the project. Normally it entails the following:

- a. investigation of structural stability and capacities (e.g. calculation of maximum allowable floor loads);
- b. description of characteristics of historic fabric, both visual and functional;
- c. examination of all physical evidence alluding to form and construction, both original and altered;
- d. analysis of each component and element to establish an understanding of its original context, evolution and current condition;

- e. investigation of all deterioration of historic fabric to establish probable causes, both interacting and isolated;
- f. analysis of original and subsequent design, work, methods of construction, uses and maintenance;
- g. identification of materials, wood species and type of stone;
- h. paint layer analysis and study of the sequences;
- i. analysis of design characteristics, including layout, decoration, style, integrity and efficiency;
- j. analysis of nails and other fasteners;
- k. analysis of period services such as gas distribution and heating;
- l. study of the macro- and micro-climates surrounding the historic site or structure;
- m. list and evaluation of all elements of existing services and mechanical equipment; and
- n. investigation of plant materials and other landscape features.

A Level "B" analysis should be a co-ordinated effort by restoration engineers and architects and other professionals experienced in conserving historic sites and structures. The actual conduct of field work requires specialists from both contemporary practice (e.g. electrical and mechanical engineers) and restoration practice (e.g. material conservation specialists).

#### 4.4 LEVEL "A" (EXHAUSTIVE ANALYSIS)

Level "A" is an exhaustive analysis to uncover all that is worth knowing about a historic site or structure. It is the most thorough level of analysis and is carried out only when the exact appearance at a certain period, the total account of the causes of deterioration, the underlying complications that might affect conservation implementation and so on, must be pinpointed. In practice, a Level "A" analysis fills many information gaps left in a Level "B" analysis.

In theory, a Level "A" analysis might be considered incomplete until all evidence is collected on the type and condition of structural and finishing materials, defects and other causes of deterioration and the form and character of all missing elements. In practice, it is unlikely that this complete state of knowledge can ever be attained for reasons of economy and the need to preserve historic fabric. Nevertheless, a Level "A" analysis, by extensive sampling, testing and probing, aims to achieve the practicable limit of important information. Generally, some of the exhaustive analysis will have to be scheduled along with the actual restoration work.

Many issues need examination in a Level "A" analysis. In addition to what is covered in the Level "B" analysis, the following examples illustrate the exhaustive nature of a Level "A" analysis:

- a. structural evaluation of historic assemblies to determine actual behaviour;
- b. comprehensive identification of materials (e.g. variations within a wood species);
- c. piece-by-piece list of tool marks, fasteners and other evidence of work and construction;
- d. precise paint colour identification (Munsell System), pigment and binder analysis, colour shift and application;
- e. mortar analysis, composition by weight and volume, compressive strength, binders, aggregate, colour impurities; and
- f. pollen analysis and plant pathology.

#### 4.5 APPLICATIONS OF EACH LEVEL

Each level of analysis has specific applications, as outlined below.

##### Level "D" Analysis

- a. departmental inventory of buildings and works of historical significance;
- b. reports to help the Department assess a site or structure for a potential acquisition or development agreement;
- c. preparation of initial program schedules for additional research and analysis; and
- d. preparation of initial plans and Class "D" cost estimates for conservation.

##### Level "C" Analysis

- a. supportive information for historical studies;
- b. preparation of master plans and Class "C" cost estimates for conservation;
- c. preparation of tentative design options;
- d. preparation of designs and proposals for initial conservation or other minor works;
- e. cases where demolition or significant change dictates recording (analyzing, making drawings and so on) to be the only possible form of preservation; and
- f. preparation of detailed program schedules for development.



### Level “B” Analysis

- a. detailed planning of physical layout, supportive services, circulation and so on;
- b. preparation of preliminary design schemes and Class “B” cost estimates for conservation;
- c. preparation of designs and specifications where a historic structure is comparatively simple or where other studies (e.g. historical research) provide sufficient information; and
- d. preparation of designs and specifications for adaptive reuse projects.

### Level “A” Analysis

Exhaustive analysis is carried out when highly detailed information is required. Planning and design decisions about such issues as the type of conservation, the historic period to be portrayed (for period restoration schemes) and the area to be covered will determine the required degree of detail. A Level “A” analysis is warranted when dealing with complex or especially significant structures designated for protection and commemoration and having a period restoration scheme.

Seldom will a project require a contribution from each category of analysis. A project may require involvement from only one or two types; moreover, the level of analysis may differ among types. It might be appropriate to provide a Level “B” mechanical services analysis with a Level “C” architectural analysis for an adaptive reuse scheme.

In practice, there is usually little difficulty identifying the types of analysis required for a historic site. There is a greater problem when identifying the specific level appropriate at a given time. Considerations might include:

- anticipated type and degree of intervention
- stage in the conservation process
- complexity of the site and structure
- architectural or historical significance
- anticipated project schedule and resources
- conditions of fabric and structure

These and related issues are discussed in detail in Section 2 “Determination of Scope.”

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## 5.0 SELECTION OF CATEGORIES AND LEVELS OF ANALYSIS

While most analysis of historic sites and structures is project-oriented to provide information for subsequent action plans, technical investigations can also be conducted for research and other archival purposes.

The exhaustive physical investigations necessary to support the replication of a historic period are both inappropriate and impossible to provide for every historic structure. On the other hand, a superficial investigation will not suffice for detailed conservation action.

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**VOLUME III**  
**HISTORIC SITE**  
**ANALYSIS**

**2**  
**DETERMINATION OF SCOPE**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
OTTAWA (819) 997-9022

ORIGINAL DRAFT: D. BOUSE



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## 1.0 INTRODUCTION

Unlike many capital projects, those involving the conservation of historic sites and structures require in-depth investigation of extant physical resources to provide sufficient information for planning and design. In providing this information, the first step is to determine what the scope of the investigations should be.

This section outlines various criteria to help restoration staff and management initiate and direct the physical investigations of period landscape features, buildings, vessels and other works associated with sites of national significance. These guidelines are to supplement other Canadian Parks Service (CPS) project procedures.

## 2.0 GUIDELINES FOR DETERMINING SCOPE OF ANALYSIS

### 2.1 PURPOSES

The primary purpose of the scope of analysis statement is to identify information requirements for planning and design and the extent and character of work to be included in the physical investigation. The statement can also spell out procedures, levels of analysis and latitude in deviating from the stated requirements.

### 2.2 PROCEDURES

Under current project management procedures, the project manager is responsible for determining the scope of analysis and the technical skills needed to conduct the physical investigations. Normally, the manager collaborates with restoration professionals and other specialists when establishing the scope of analysis.

The scope of analysis statement is developed in three steps, as described below. These steps can be followed intuitively or systematically, depending on the uniqueness of the project and the desired degree of control.

## 3.0 STEP ONE: IDENTIFICATION OF BASIC ISSUES AND CONSTRAINTS

Step one involves the identification of issues peculiar to the historic site likely to affect the physical investigations. The project manager and restoration specialists can use this information to concentrate on

areas of importance and to orient the physical investigations accordingly. Considerations normally include:

### 3.1 PHASE OF THE CONSERVATION PROCESS

The conservation process can be broken down into a number of phases. Although there is currently no one set pattern for all historic sites, most follow this order:

- a. some type of commitment
- b. initial conservation
- c. in-depth research
- d. project definition
- e. preliminary and detailed drawings
- f. specifications
- g. project implementation
- h. operation
- i. maintenance

Although analysis is primarily carried out for the early phases, it can surface in various forms throughout the conservation process.

During the early phases, the physical investigations must be progressively more thorough to avoid incorporating inadequate or erroneous information into later conservation proposals. Normally, an initial (Level "D") analysis is sufficient for the commitment phase and a thorough, comprehensive analysis (Levels "B" or "A"), for the preliminary and detailed drawings phase (see Section 1 "Categories and Levels of Analysis").

### 3.2 TYPE AND DEGREE OF ANTICIPATED PHYSICAL INTERVENTION

A capital project normally involves significant physical intervention (that is, making important alterations or modifications to a site, building or engineering work). Most analysis is project-oriented. It provides information for subsequent plans and designs.

The type and degree of anticipated physical intervention will affect these information requirements. Those preparing the scope of analysis should bear in mind that each category of intervention has specific information needs. Also, the anticipated physical intervention will influence the detail and precision expected of the physical investigations. Generally speaking, period restoration requires an emphasis on establishing an accurate historical perspective; stabilization 'as is' requires more of a focus on determining physical condition. A rehabilitation proposal involving minor physical change may require less detailed investigation than one involving major alterations.

*Louisbourg, NS*

### 3.3 CHARACTERISTICS OF THE SITE OR STRUCTURE

The complexity and size of the site or structure in question will influence the level of analysis conducted by restoration staff. A large but simple structure, such as historic fortification walls, normally demand less investigation than a small but complex structure, such as a historic vessel. The levels of analysis will, in turn, affect information requirements. In preparing the physical investigation, the project manager should keep in mind overall size, complexity of detailing, unusual assembly and materials, repetition of elements and identifiable subdivisions.

A second important variable is the condition of the fabric or structure. If considerable effort is anticipated to establish the causes and effects of deterioration and to provide sufficient information for remedial proposals, other information requirements may have to be downplayed or deferred.

If the site is of particular historical or architectural significance, questions of original design and subsequent evolution may take priority. The project manager should be aware of issues of importance and their relative merit to orient the physical investigations appropriately.

### 3.4 ANTICIPATED PROJECT SCHEDULE AND RESOURCES

The overall objectives of the analysis are affected by the following:

- a. scheduling parameters, including seasonal constraints;
- b. expertise and availability of professional staff;

- c. availability of special equipment;
- d. constraints imposed by the Historic Sites and Monuments Board of Canada;
- e. financial resources;
- f. remoteness of site or structure; and
- g. availability of existing information, reference material and comparative studies.

The project manager should be aware of potential conflicts when determining the scope of analysis.

## 4.0 STEP TWO: DEVELOPMENT AND EVALUATION OF OPTIONS

Step two identifies, compares and evaluates options for analysis. The options relate to potential information requirements, levels of analysis, areas of investigation and questions to be answered.

In establishing options, the project manager and restoration specialists should proceed from the general to the specific. In some cases a Level "D" analysis may be sufficient. In other cases, they should itemize areas of concern.

Given that analysis should never seek all the answers, each option should be evaluated according to the following criteria. These criteria apply to all analyses of historic sites and structures regardless of project variables.

### 4.1 PROTECTION OF HISTORIC FABRIC

Protection of historic fabric is fundamental. Where historic structures are to be saved, other considerations must be subordinate to the requirements of preservation. A comprehensive analysis must provide sufficient information for both interim and long-term protection.

Often, non-destructive investigations will not be sufficient for design needs. This creates a dilemma. On the one hand, to leave parts of the structure deliberately unstudied invites changes of plan during implementation. On the other hand, general dismantling or other examinations to the point of destruction can defeat the purpose of the analysis. Such dilemmas require professional judgement for their solution. On occasion, additional analysis should be scheduled along with the implementation.

Requirements for protection of historic fabric may extend to the provision of measures to counteract fire, vandalism, structural collapse or other threat.

## 4.2 SAFETY AND SECURITY OF PERSONNEL

The need for protection against any personal hazard during and after the investigation must be recognized. The danger of direct injury has to be considered, as well as exposure to toxic substances and more subtle dangers such as the risk of histoplasmosis from bird- or bat-infested sites.



*Winant's Store, Dawson, YT*

## 4.3 ECONOMY

The efficient use of personnel and the optimum return for expenditures should be reflected in the choice of analysis and cooperation with others in pursuit of common objectives. Economy is also achieved by appropriate levels of flexibility and adaptability to changing circumstances.

## 5.0 STEP THREE: RESOLUTION

Step three in determining the scope of analysis involves selecting the analysis and clearly stating its aims and scope.

The scope of analysis can be stated in various formats (e.g. a report for capital projects; a memorandum to confirm verbal directions for physical investigations of minor works or for reference).

Every statement of scope should cover the project context and a detailed description of the physical investigations to be done (including the areas to be examined or excluded, the types of issues to be covered, the anticipated depth or degree of detail and the tests to be done or methods of analysis to be carried out).

Such a statement may then be incorporated into one of the following types of documents:

### a. Approved Project Briefs:

Analysis in support of major capital projects for historic sites should be initiated by an approved project brief. The scope of analysis statement is incorporated into the third section, "Requirements and Restraints." (See 42.6 "Guidelines for the Preparation of a Project Brief and a Design Brief." Parks Canada)

### b. Terms of Reference:

When the analysis is multidisciplinary, the project manager should draw up a terms of reference and assignments of responsibility for each discipline. (See 42 "Project Management" for procedure, and Vol. I and the appropriate sections of Vol. III of this manual)

### c. Contracts:

When the physical investigations are to be carried out by specialists on contract, appropriate portions of the scope of analysis statement should be expanded and incorporated into the section of the contract dealing with services and work performed.

## 6.0 REASSESSMENT, REVISION AND APPLICATION

As analysis progresses, changes to the original scope of analysis may be needed because of important unexpected evidence discovered. To avoid unnecessary or inappropriate investigation, the scope of analysis should be reassessed as stages of investigation are completed. All revisions to the scope of analysis statement should be noted in the project dossier and applicable project files.

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# **VOLUME III HISTORIC SITE ANALYSIS**

## **3 INVESTIGATION OF COMPARATIVE SOURCES**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
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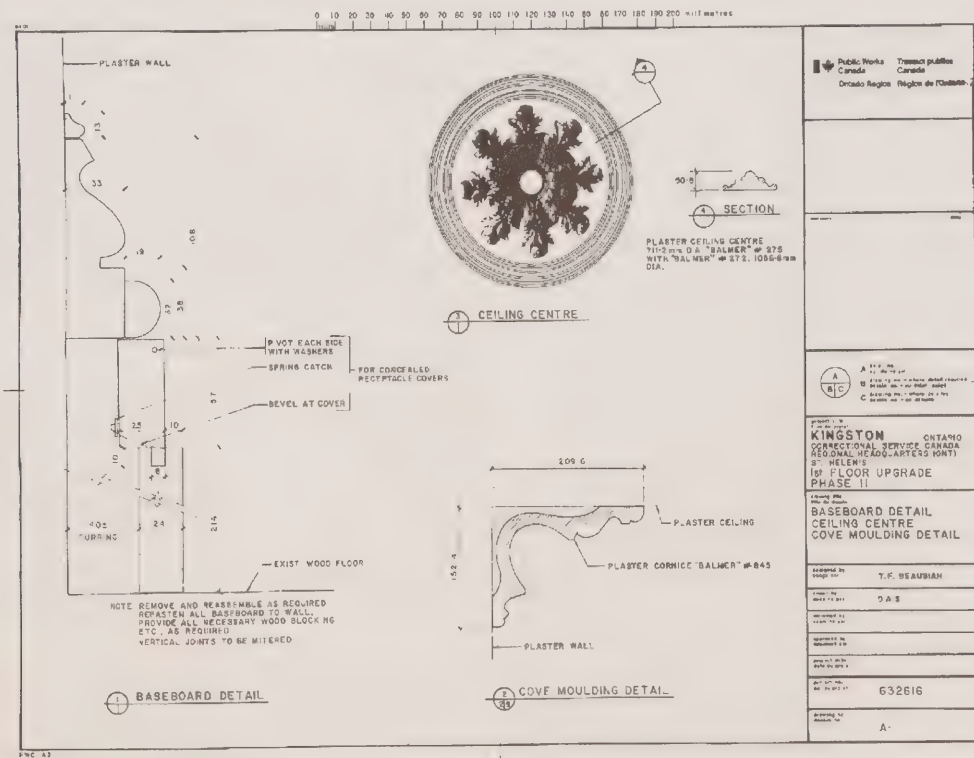
## 1.0 INTRODUCTION

An important part of pre-design information gathering is the investigation of comparative sources. By studying and comparing similar structures and related documentary material, the restoration architect and other members of the conservation team better digest specific information on a given historic structure. This provides a clearer understanding of conservation design problems and a broader and more accurate historical perspective.

This publication gives guidance and instruction in basic techniques and procedures for investigating comparative sources. It also describes the potential role of comparative studies when preparing for and concluding an investigation.

## 2.0 CONTEXT FOR COMPARATIVE INVESTIGATION

The information about a site's appearance at a given period may be obtained from direct examination of the physical evidence on-site. However, it is often incomplete and may have to be supplemented by limited conjecture based on information from secondary sources. Comparative investigation provides greater opportunity for describing the former appearance of the site and developing comprehensive recommendations.



St. Helen's, Kingston, ON

Specifically, the investigation of comparative sources:

- a. provides information about design issues, such as layout, style, construction details, materials and finishes;
- b. helps to differentiate between those characteristics of the structure which are common to the period or locale and those which are unusual or unique;
- c. helps the investigator to resolve questions of missing or conflicting evidence from a given structure; and
- d. provides background information on the possible influence of cultural and environmental issues on the selection of site, layout, style, etc.

The results of comparative investigations can also provide reference data for other restoration projects and research work.

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### 3.0 TYPES OF COMPARATIVE INVESTIGATIONS

#### 3.1 BACKGROUND STUDIES

This method of investigation includes both intuitive comparisons and cursory comparative analyses. Background studies explain why certain layouts, styles, construction details, materials and finishes were used historically, how they came to be altered and why they appear as they do today. The analysis of a particular building must be conducted with an awareness of issues beyond the surviving fabric. Background studies provide this awareness.

Background studies are recommended for all levels of analysis.

#### 3.2 DETAILED COMPARATIVE ANALYSIS

This method of investigation includes a systematic examination of similar structures. The results from all evidence can be used as a basis to develop plausible architectural theories concerning the character and physical evolution of the particular structure under investigation.

These hypotheses guide more intensive examinations of surviving physical evidence and are the basis for feasible restoration proposals.

Detailed comparative studies are recommended for any exhaustive or general levels of analysis where missing or conflicting information affects important issues of historical perspective.

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### 4.0 PROCEDURES

#### 4.1 ASSEMBLING AND CORRELATING COMPARATIVE INFORMATION

In general, comparative information exists in three forms: graphic, written and physical (dealing with actual building fabric).

Make suitable notes and copies when assembling and correlating the various pieces of information. For background studies, diazo or xerographic copies of written and graphic material are sufficient for most purposes. Notes plus sketches or photographs are suitable for most physical examples. Detailed investigations might require measured drawings and large-format photographic coverage.

#### 4.2 REPORTING AND PRESENTATION

Normally the results of comparative studies are indirectly reported through the architectural analysis reports. When of general interest, the studies should be issued on their own or distributed as appendices to the analysis report of a given structure.

Studies of special interest should be produced in special reports using a 215 mm x 280 mm format containing drawings, photographs, written descriptions and summary. Provide one copy for each region and Architectural and Engineering Services (A&ES) Headquarters, Technical Documents Centre.

#### 4.3 DISPOSITION

At the conclusion of the predesign analysis, the collected information from the comparative investigations should be clearly labeled with date, project and primary compiler and placed in the technical services information collection or the detailed project dossier.

See also "Government Records Disposal Schedule" and other records management guidelines.

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### 5.0 COMPARATIVE SOURCES

Four types of sources are cited in this article which represent the most common groups of comparative information.

### 5.1 COMPARABLE STRUCTURES AND DETAILS

Often, the best comparative sources are the actual buildings and details themselves. Components collections, artifact collections and other restored sites are also valuable sources of information. An investigator should make particular note of local buildings and those of similar cultural origins.

Comparable buildings can be located by consulting special lists of extant historic structures, obtaining direction from research specialists and looking in likely places. The Canadian Inventory of Historic Building (CIHB) is a good initial reference. The Inventory contains a comprehensive list of over 200,000 extant period structures. A "basic data" printout, plus location data from the CIHB, should be consulted before going into the field to search for comparable buildings. Most provinces and many cities also have listings of extant historic structures which can be consulted beforehand.

### 5.2 PHOTOGRAPHIC SOURCES

Period and recent photographs provide important sources of comparative information. Some of the best collections include research libraries and archival collections. Recent photographic sources include heritage record photo reports, air photo libraries, photographic inventories, other technical services collections, designated building reports and personal collections.

The CIHB has produced in excess of one million photographs of extant historic buildings. These photographs are accessible for comparative study through the National Archives of Canada (NAC) or through the CIHB. Also, most provincial and city listings of extant structures include recent photographic coverage of historic buildings.

Other good sources of recent photographs are the Heritage Records Collection of the Technical Data Services Division, A&ES, the project dossiers from similar Canadian Parks Service projects and the collections of technical data maintained by each CPS region.

Historical and archaeological research brings together many period photographs suitable for comparative analysis. Each CPS research unit contains collections of photographs showing period buildings. The Research Information Unit, Research Division, National Historic Sites Directorate is the coordinating group for material no longer needed for an active project.

### 5.3 ARCHITECTURAL DRAWINGS AND CARTOGRAPHIC SOURCES

Both period and recent drawings are good sources of information. Record drawings, field notes, other measured drawings and period plans are available from technical information collections, libraries and archives, technical colleges and project files.

The Government Cartographical and Architectural Records Section of the NAC and the A&ES Technical Document Centre both contain numerous measured drawings of selected extant buildings from across Canada. McGill University, University of Toronto and several other schools hold regional collections of measured drawings of historic structures.

Noteworthy collections of historic architectural drawings are held in the Nova Scotia Archives, Canadian Centre for Architecture in Montreal, Ontario Association of Architects, Metro Toronto Central Library and Canadian Architectural Archives, Calgary. Other noteworthy special collections of historic drawings include the Fortress of Louisbourg Archives.

### 5.4 PUBLISHED AND WRITTEN SOURCES

These sources include books, pamphlets, bulletins, catalogues, unpublished printed sources (such as the Parks Canada Manuscript Report Series) and microfilm copies of period publications and documents. When locating this type of information, it is good practice to obtain historical research assistance, especially when searching for written sources, such as construction specifications of lists of materials that are contemporary with the structure being investigated.

The Environment Canada Library, Chaudière Branch, the A&ES Technical Documents Collection and the Parks Research Division Research Collection contain numerous published and written sources which provide useful comparative material. Noteworthy holdings include the 128 reels of microfilm, acquired by the Chaudière Branch Library, comprising over 1,500 books, portfolios and pamphlets on architecture and related subjects available in North America before 1895.

The CIHB structures file and its architects and builders file can be valuable sources when compiling comparative information. Many municipalities and all territories and provinces have libraries, archives and other designated repositories for published and written information describing historic structures.





*K.T.M. Co. – Klondike Thawing & Melting Co., Dawson, YT*

## 6.0 MAJOR COLLECTIONS OF COMPARATIVE INFORMATION

### 6.1 NATIONAL COLLECTIONS

The following noteworthy collections contain comparative material from across Canada:

#### *Canadian Inventory of Historic Building:*

The Inventory contains photographs and descriptions of structures which can be retrieved by computer search. For assistance, contact Chief, Canadian Inventory of Historic Building Division, National Historic Sites Directorate, Jules Léger Bldg., 25 Eddy Street, Hull, PQ. K1A 0H3.

#### *Research Collections – Historical Research Archives:*

This collection includes photographs, architectural drawings, research findings and bibliographies of published and printed material. For assistance, contact Head, Historical Research Branch, National Historic Sites Directorate, Jules Léger Bldg., 25 Eddy Street, Hull, PQ. K1A 0H3.

#### *Technical Data Collections – A&ES:*

The Technical Documents Collection of Architecture and Engineering Services contains measured drawings, photographs and printed reports covering many historic sites across Canada. For assistance contact Head, Technical Documents Collection, Architectural and Engineering Services for Environment Canada, Jules Léger Bldg., 25 Eddy Street, Hull, PQ. K1A 0H3.

#### *Environment Canada Library, Chaudière Branch:*

Most library material suitable for comparative study is available on interlibrary loan. For assistance, contact Librarian, Chaudière Branch, Environment Canada, Les Terrasses de la Chaudière, 10 Wellington Street, Hull, PQ. K1A 0H3

#### *National Archives of Canada – Cartographical and Architectural Records:*

This collection contains architectural drawings from various government departments and other architectural records. For assistance, contact Head, Government Cartographical and Architectural Records Section, National Map Collection, Archives Branch, National Archives of Canada, Ottawa, ON. K1A 0N3.

## 6.2 REGIONAL AND SPECIAL COLLECTIONS

The following noteworthy collections include information covering regional sources or special themes and subjects.

*Louisbourg Archives:*

This collection emphasizes comparative structures dating from early and mid-18th century. For assistance, contact Archivist, Fortress of Louisbourg National Historic Park, Louisbourg, NS. B0A 1M0.

*Public Archives of Nova Scotia:*

Archives holdings include architectural drawings and records from provincial architects' offices. For assistance, contact Map Archivist, PANS, Halifax, NS. B3H 1Z9.

*Public Archives of New Brunswick:*

Archive holdings include architectural drawings. For assistance, contact Map Curator, P.O. Box 6000, Fredericton, NB. E3B 5H1.

*Archives Nationales du Québec:*

Archives holdings include historic plans. For assistance, contact Directeur des Cartes et Plans, Département des Cartes et Plans, 115 Côte de la Montagne, Québec, PQ. G1K 4E4.

*Université Laval:*

University holdings include measured drawings of historic buildings. For assistance, contact Archives Section, Bibliothèque, Ste-Foy, PQ. G1K 7P4.

*Université du Québec:*

For assistance, contact Services de Collections Spéciales, Bibliothèque Générale, CP 8888, Montréal, PQ. H3C 3P8.

*McGill University:*

University holdings include original measured drawings and photographs of old Canadian architecture. For assistance, contact Blackadder-Lauterman Library of Architecture and Fine Art, McGill University, Montréal, PQ. H3B 2Y4.

*Direction Générale du Patrimoine:*

For assistance, contact Centre de Documentation, Ministère des Affaires Culturelles, Direction Générale du Patrimoine des Biens Culturels, 6, rue de l'Université, Québec, PQ. G1R 5A6.

*University of Toronto:*

University holdings include measured drawings of historic buildings, mostly in Ontario. For assistance, contact Architecture Library, 230 College Street, Toronto, ON. M5T 1R4.

*Metro Toronto Central Library:*

The MTCL holdings include architectural drawings; especially noteworthy is the Howard collection. For assistance, contact Head, Canadian and Manuscripts Section, MTCL, 789 Yonge Street, Toronto, ON. M4W 2G8.

*Archives of Ontario:*

The Archives holds numerous drawings from architects' offices; recent acquisitions include the E.L. Horwood collection. For assistance, contact Archivist, Map Collection, Ministry of Culture and Communications, 77 Grenville Street, Toronto, ON. M7A 2R9.

*Ontario Association of Architects:*

The OAA collection includes original architectural drawings mainly from Toronto and vicinity. For assistance, contact OAA, Park Rd., Toronto, ON. M4W 2N2.

*University of Regina:*

For assistance, contact Map Library, Faculty of Arts, University of Regina, Regina, SK. S4S 0A2.

*Canadian Architectural Archives:*

The Canadian architectural collection concentrates on 20th century architecture in Canada. For assistance, contact The Curator, Canadian Architectural Archives, The Library, University of Calgary, 29220-24th Avenue NW, Calgary, AB. T2N 1N4.

*Glenbow-Alberta Institute Archives:*

Comparative material includes historic photographs of buildings west of the Great Lakes. For assistance, contact Archivist, Glenbow Foundation, 902-11th Avenue SW, Calgary, AB. T2R 0E8.

*Provincial Archives of British Columbia:*

Collection includes architectural drawings. For assistance, contact Archivist, Map Collection, Parliament Buildings, Victoria, BC. V0V 1X4.

*Alberta Inventory of Potential Historic Sites:*

For assistance, contact Alberta Culture, Historic Resources Division, St. Stephens College Residence, 8820 112 Street, Edmonton, AB. T6G 2J6.

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# **VOLUME III**

# **HISTORIC SITE**

# **ANALYSIS**

## **4**

## **ARCHITECTURAL ANALYSIS**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
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PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
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ORIGINAL DRAFT: D. BOUSE

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- 6.7 CONCLUSION AND RECOMMENDATIONS



## 1.0 INTRODUCTION

The variety of historic buildings held by the Canadian Parks Service (CPS) prohibits a single set of procedures for architectural investigations. The problem of assessing buildings of different periods, functions, construction types and geographic settings is compounded by the many project variables encountered when protecting heritage resources. To varying degrees, each architectural investigation must be tailored to the individual project and to its planning and design needs.



*Maison Laurier, Laurentides, PQ*

One common requirement is the need for an architectural overview of the entire building. This overview or general assessment provides information for project planning and budgeting and provides a context for future detailed investigations.

### 1.1 PURPOSE

The following guidelines describe the procedure for conducting an architectural general assessment. This publication is intended for use by managers, planners, architects and technologists engaged in planning or conducting an architectural investigation of buildings and works of historical interest.

### 1.2 DEFINITION

In this publication "architectural general assessment" refers to the task of obtaining architectural information pertaining to the overall building; interpreting and evaluating that information; drawing conclusions; and reporting, in brief, the findings and conclusions.

An "architectural general assessment report" is any report which provides an overall understanding of a heritage structure from the architectural viewpoint.

## 2.0 PURPOSE AND SCOPE OF THE GENERAL ASSESSMENT

The purpose of the general assessment is to provide a general description of a building and to concisely describe the known limitations and problems of that building in light of its requirement for protection and future utilization. The general assessment should describe the composition, conditions, adequacy of the original and altered fabric and other important issues concerning the character of the building and its conservation.

The architectural general assessment report presents a summary statement of the general investigation, accompanied by an indication of the degree of conjecture used by the architect in the assessment. This information will assist in evaluating protection and development options within the context of program priorities. The report should also provide a context within which to conduct and evaluate continuing investigations and analyses of the building components and elements.

The scope of the report depends on protection and utilization considerations and the limits imposed by the project schedule and personnel.

Unless faced with a rigid, predetermined program, the scope of the general assessment investigation should not be restrictive.

The investigations to be conducted during the general assessment may form an independent project activity or they may be part of a collective effort, conducted in conjunction with engineering analysis, historical research and other types of investigations.

When the architectural general assessment is part of a larger undertaking, a project brief (terms of reference) will be prepared, outlining the interrelationships and co-operative aspects which lead toward common goals.

## 3.0 APPLICATION

A general assessment carried out as part of conservation commitment would correspond to a Level "D" architectural analysis (see Section 1). For an average-sized dwelling, this assessment should normally take no more than one day to prepare. More complex buildings may require somewhat longer.

A general assessment carried out during the initial conservation phase would correspond to a Level "C" architectural analysis. This degree of thoroughness would require additional investigations of critical areas of the building to provide a more complete overview of the entire historic structure.



*Fort Wellington Guardhouse, Prescott, ON*

At the completion of both the property research and design phases, a general assessment should be based on a comprehensive level of architectural analysis corresponding to Level "B" or in exceptional cases to a Level "A" analysis. The process of preparing a general assessment of this type consists of pulling together and synthesizing the detailed analysis findings into a connected and comprehensible overall assessment of the building. It might require several weeks to prepare this level of general assessment in addition to the time needed to analyze all of the building details.

## 4.0 PREPARING FOR A GENERAL ASSESSMENT

### 4.1 TERMS OF REFERENCE

Take the following steps when preparing the terms of reference for an architectural general assessment:

- a. Define clearly the objectives of the investigation. Include the relationships to other project work and investigations as mentioned in 2.0, as well as the anticipated use of the results.
- b. Identify issues and constraints which are particular to the historic building and which will affect the investigation. These issues normally include the type and degree

of anticipated modification, complexity of the structure, overall project schedule, condition of fabric, historical and architectural significance and the availability of supplementary information.

- c. Determine whether the general assessment will be carried out by a consultant, in-house or by another government agency. The wording of the terms of reference will depend on the relationship with the investigator and on the flexibility of the program.

After ensuring that the objectives will satisfy planning and design needs, the manager should review the assignments of responsibility, scheduling and other issues with the technical personnel who will be directly responsible for conducting the general assessment investigation.

### 4.2 BACKGROUND PROJECT INFORMATION

Before proceeding with the on-site investigation, the architect should review all existing project documentation.

Many CPS historic sites have been previously investigated. While the reports may be incomplete or superficial, they form a valuable record which should always be reviewed by the architect during the investigation.

### 4.3 BACKGROUND HISTORICAL INFORMATION

The architect should also review relevant historical and archaeological information. Knowledge of historic plans, photographs, research reports and other source material concerning the site, occupants and structure is a necessary base for conducting a general assessment.

Whenever possible, the architect should work with research staff in gathering information for analyses. The architect should become conversant with source material from other similar buildings, in order that unusual methods of construction and other characteristics of the building in question can be recognized.

### 4.4 PROCEDURES

Assemble measured drawings of plans, elevations and sections and other relevant documentation, in a workable format (such as an accopress binder) for field use. This way, historical data, engineering recommendations and other essential references will be on hand and accessible during the investigation.

Arrangement must be made for access and for special equipment and assistance from other specialists if necessary.

It is preferable to start the inspection with general observations and move to more specific problems in a systematic manner. This will reduce the risk of omission or error. The fundamental purpose of the general assessment should never be overshadowed by numerous, unrelated details. It is the architect's first responsibility to keep in mind that the building is being investigated as an integral and interdependent whole, not merely an aggregate of building materials. Throughout the general assessment, the relationship between details and whole should be kept in perspective.

## 5.0 CONDUCTING A GENERAL ASSESSMENT

### 5.1 EQUIPMENT

The architect should be familiar with the specialized aids which may be required to assist in carrying out the investigation. The following list of equipment is normally suitable for most general assessment field inspections:

- carry case
- small first aid kit
- screwdriver
- small pry bar
- probe, pick or awl
- scalpel/cutting blade
- pocket knife
- hand broom or brush
- plumb bob
- rubber mallet
- flashlight
- safety boots
- work clothes
- work gloves
- calipers
- folding saw
- small spirit level
- measuring tape (4m or 5m)
- sand paper
- chalk and chalk line
- 35mm camera and film
- flash attachment
- graphic scale (for photographs)
- tweezers
- push pins
- string
- magnifier
- clip board/portable drawing board
- set square

- drafting scale
- waterproof pens
- pencils
- notebook
- field drawing sheets (PC 886)
- plastic bags with ties
- small boxes
- tags
- masking tape
- protimeter

Note: A list of special, additional equipment is contained in Section 5.

### 5.2 CHECKLISTS AND DATA FORMS

Checklists and technical data forms may be useful reminders when making observations during the field investigation. An architect can prepare his or her own forms tailored to the specific assignment or use general purpose forms (see Vol. I.3 "Information Management" for guidance in preparing specially tailored forms and for guidance in using general purpose forms).

### 5.3 BUILDING ORIENTATION, CONTEXT AND DESCRIPTION

Begin the general assessment by noting the geographic setting, the immediate environs, the overall form, the size and proportions of the building. Note features which seem to be unusual or out of place. Keep in mind features which appear to be typical for the location, the time period and the functions of the building.

Observe conditions which would have an effect on the historic appearance or on deterioration (e.g. presence of an adjacent swale or overhanging trees).

The basic description of the building should include architectural style and layout, materials and methods of construction, plus any special elements which are particular to the building being investigated. As far as possible, the evolution of the building should be determined and current physical condition noted.

### 5.4 LAYOUT/PLAN

Floors, ceilings, partitions and other evidence give clues to historic layouts. When it is possible to deduce or assume these layouts, they should be compared with the existing plan. Note and compare circulation patterns and arrangements of activities.

### 5.5 BUILDING COMPONENTS AND ELEMENTS

The general assessment should include a cursory examination of the building components and elements.

#### a. Foundations and Supports:

Both historical evidence and causes of deterioration can be revealed by the foundation system. Crawl spaces and basement rooms should be inspected for signs of original configuration, alteration and prior function. Raceways, flumes, drains, fireplace clean-outs, coal chutes, etc., are of particular interest.

#### b. Façades, Walling and Framing:

It is important to provide a general description of the exterior façades and overall framing. Note evidence of the causes and effects of important defects and current maintenance and operational problems.

#### c. Roof System:

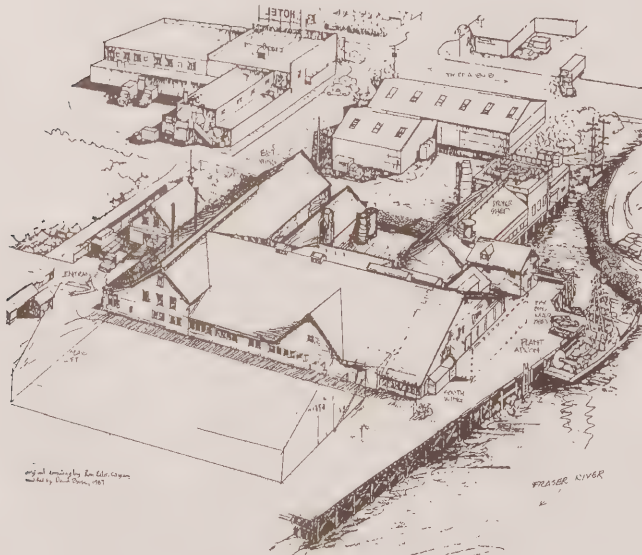
Inspect the roof structural systems, assemblies and materials in general terms. Note the following elements:

- framing
- sheathing and covering
- flashing and rainwater fixtures
- dormers, cupolas and attached elements

#### d. Floors, Walls and Ceilings:

If possible, ascertain the framing of floors, ceilings and interior walls and make note of interior structural supports.

Floor, wall and ceiling finishes should be recorded, as should any woodwork, decorative plaster work or other architectural features. Special note should be made of any indications of change to layout or decoration.



*Gulf of Georgia Fish Cannery, BC*



Sketch plans and sections are useful methods of conveying summary information.

e. Stairs:

Note the following stair elements when possible:

- layout and any indications of alterations
- supports and framing
- surface materials, newels, handrails and any decorative element

f. Windows and Doors:

Note the following window and door elements during the investigation:

- framing
- leaves and sash assemblies
- glazing material and divisions
- ornamentation and surrounds
- notable hardware

g. Associated Features:

Give special attention to such features as fireplaces, because their design may indicate whether they were used for heating or cooking, thereby revealing functions of the room. Briefly inspect porches, galleries, fences, boardwalks, light fixtures, heating equipment, telephone, ventilation and water, sewage and drainage systems. Built-in equipment and other associated features can likewise indicate changes of activities over the years.



*Historic Properties, Halifax, NS*

## 5.6 SAFETY AND SECURITY

The architectural investigation must consider problems of fire, vandalism, flooding, collapse and personal hazard. If a fire inspection survey of the building has not been conducted, the architect must look for fire and safety hazards.

The architect should ensure that all necessary safety precautions are considered before proceeding with the field inspections. Safe practices should always dictate during the investigations.

## 6.0 CONTENTS OF A GENERAL ASSESSMENT REPORT

The following sections describe the content of a typical architectural general assessment report. Organization for the report should follow similar lines. Illustrations should be used whenever they clarify the information being provided.

### 6.1 PROJECT CONTEXT

The report should contain basic information about the project and circumstances surrounding the task of conducting the assessment. Give dates, relevant project numbers and file numbers. Include the terms of reference as an appendix.

### 6.2 SOURCES OF DATA

The architect should specify major sources of information that were consulted. These sources may be included in a bibliography or a list of printed and published resources within the body of the report, so that one may retrieve these materials in the future. Give the names of individuals who provided a major contribution along with the position and address of the resource persons.



### 6.3 SITE AND SETTING

An investigation of site and setting should give basic information on location and physical surroundings. It should make reference to other investigations and related reports.

Identify the building location on a site plan. If the building has a street address, accurately record it with the name of the owner, the city and the province.

If the site is in an area without a street address, give the appropriate Universal Transverse Mercator grid co-ordinates (at least  $\pm 100$  m).

If not described in other documentation of the building, this section should report the modes of access, plus the available utilities (electrical, water, sewage, etc.).

Describe the lay of the land and natural features considered to be of interest. Provide important climatic data, particularly information affecting the design, construction or operation of the building.

### 6.4 SUMMARY TECHNICAL DESCRIPTION

Prepare a general technical description of the building using appropriate technical terms and standard (SI) units of measurement. It should include such information as materials, type of construction, dimensions, type of use and relative age of the different elements of the structure.

The appropriate Capital Assets Inventory System (CAIS) forms can be used as guides when preparing a cursory technical description. For a more precise description, reference material from the specific discipline (e.g. military engineering) should be consulted. It is not necessary to include complete room schedules for finishes, door and window hardware, etc. However, all significant features of the building should be described here in brief.

### 6.5 HISTORICAL SUMMARY

It is important that a clear historical perspective be established, as a means of understanding present conditions and a basis for physical intervention designs. Both the on-site evidence and documentary information already assembled should be used in developing the historical summary.

Point out major design characteristics and stylistic features. Design aspects that are particularly innovative, unique or successful may contribute to the architectural and historical significance of the building. The report should differentiate between present appearance of the building and historical configurations. It is often beneficial to illustrate these differences with a schematic plan and elevation drawings.

### 6.6 ASSESSMENT OF PRESENT CONDITION

Often, it is good practice to divide the section on present condition along the lines of the checklist (see 5.5). Observations should be limited to important aspects of the building and not to all characteristics recorded during the investigation. The architect should draw attention to basic deficiencies found within the building. The requirements for future protection should always be given first consideration.

### 6.7 CONCLUSION AND RECOMMENDATIONS

The primary goal of an architectural general assessment is to provide an overall understanding of the building from the architect's point of view. The architect should compare the results of the architectural investigation with investigations from other disciplines, noting any areas of uncertainty which may need clarification.

The report should normally make recommendations on the need for additional investigations and on options for conservation treatment. In preparing recommendations for physical intervention, distinguish between requirements for immediate protection designed to halt the active forces of deterioration on the site and suggestions for long-term development designed to enhance the historic building. In each case, Class "D" or "C" cost estimates may be included.

*Illustrations are the property of the Heritage Conservation Program, unless otherwise noted.*

# **VOLUME III**

# **HISTORIC SITE**

# **ANALYSIS**

## **5.1**

## **STRUCTURAL ENGINEERING ANALYSIS**

## **GENERAL ASSESSMENT**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
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## 4.0 CONTENTS OF A GENERAL ASSESSMENT REPORT

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## 1.0 INTRODUCTION

The purpose of this publication is to provide guidance and instruction to engineers and technical professional personnel who are investigating historic buildings. The publication outlines the procedures for conducting a structural engineering general assessment in order to provide basic information for planning and design purposes. It should be read in conjunction with Section 4, "Architectural Analysis: General Assessment."

The structural engineering general assessment should provide a descriptive overview of the building and draw attention to its problems and potential from an engineering viewpoint. This process involves the assessment of composition, condition, adequacy and other important issues concerning the engineering needs of the building and its impact on alternative conservation schemes. For information regarding special investigation and analysis, refer to Section 9.

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## 2.0 PREPARING FOR A GENERAL ASSESSMENT

The terms of reference for the structural engineering general assessment should be prepared in accordance with Section 2.

Before proceeding with the investigation, the examiner should gather existing relevant documentation. This information should be assembled in collaboration with the project team. It should include all historical and contemporary records which will contribute to an understanding of the site's evolution, recent maintenance and present status.

When the investigation work is considered extensive or complex, the examiner should make a preliminary visit to become familiar with the site before deciding the details of work procedures and schedules. He or she should note any items which may require the assistance of technical specialists, such as the general layout of the site, including drainage patterns, location of services and conditions of access.

It is important to record all potential failures of structural and architectural elements. These failures may necessitate immediate corrective measures to ensure the safety of the examiner and to temporarily halt the deterioration of the historic fabric.

## 2.1 EQUIPMENT

A list of the basic equipment required for an investigation can be found in Section 4. The following is a list of additional equipment that may be useful to the examiner conducting a structural investigation.

- heavy duty trunk
- extension ladder
- folding shovel
- hand saw
- small axe
- portable lights
- staple gun
- chisels
- pliers
- claw hammer
- increment borer
- profile gauge
- polyethylene sheeting
- 30 m tape
- builder's level
- hygrometer
- safety harness
- climbing ropes
- fire extinguisher
- exhaust fan
- face mask
- safety goggles
- safety helmet
- compass
- thermometer
- portable microscope
- hand drill
- solvent

## 2.2 FIELDNOTES

Use engineer's fieldbooks, loose-leaf notebooks, printed forms or checklists when recording observations during the on-site investigation. The appropriate Assets Inventory System (AIS) forms can be used as guides when preparing a cursory technical assessment.



*Rural Saskatchewan*

### 3.0 CONDUCTING A GENERAL ASSESSMENT

A general assessment involves two main components – identifying building components and elements and a structural engineering assessment which investigates conditions and causes.

#### 3.1 SITE AND SETTING

A general assessment should give basic information on location and physical surroundings (see Section 9).

- a. Location:  
Identify the building on a site plan. Record the proper street address or grid co-ordinates and the name of the owner.
- b. Physical environment:  
Note the lay of the land and natural features considered to be of interest. Decide if it is necessary to conduct tests to provide more information.
- c. Access and utilities:  
Note the road, rail, water and other modes of access, plus the available utilities (electrical, water and sewage systems, etc.).

#### 3.2 ORDER OF EXAMINATION

Establish the order of examination prior to conducting the investigation. It is customary to proceed with a general overview, then an examination of the foundation and finally an examination of the superstructure. The order of investigation for the superstructure may vary depending on the type of structure, especially the type of exterior walls.

In the case of exterior masonry walls or balloon frame construction, the superstructure should be examined in two main sections:

- a. External structure:
  - exterior walls
  - roof
- b. Internal structure:
  - bearing system
  - floors
  - stairways

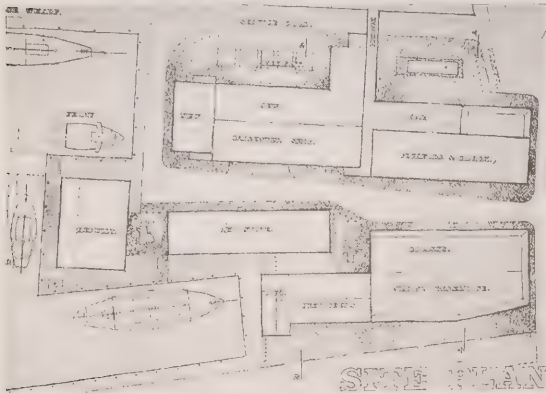
In the case of composite exterior walls, (e.g. masonry exterior walls on one storey and wood frame exterior walls on another storey or platform construction), it is easier to describe the



superstructure by level. For example, for a two-storey composite exterior wall construction, the order of examination should be as follows:

- a. Ground storey:
  - floor
  - exterior walls
  - bearing system
  - stairways
- b. Second storey:
  - floor
  - exterior walls
  - bearing system
  - stairways
  - roof

There are other methods. The examiner should decide which to use and what modifications are required in order to tailor the method to the descriptive needs.



*Historic Properties Site Plan, Halifax, NS*

### 3.3 IDENTIFYING BUILDING COMPONENTS AND ELEMENTS

The following information is listed in the order to be used for a building with exterior masonry walls or balloon frame construction.

During the investigation it may be necessary to remove some of the historic fabric in order to expose the elements to be recorded. This operation should be carried out very carefully and in hidden locations to minimize damage to the fabric. Whenever possible,

the examiner should co-ordinate the work with the recording team. The team is responsible for producing measured drawings to record the present state of the building. See also, Vol. IV.3.1, "Interim Protection: Design Standards."

- a. General:
 

Note the type of structure, e.g. wood frame, steel frame, etc. and the main exterior elements. Note the overall dimensions. Spatially divide the interior of the building into bays defined by major structural elements such as beams and bearing walls.
- b. Foundations:
 

Note the nature of the foundation soil. Note the type of foundation such as post and mudsill, concrete footing, piles, etc. If possible, determine the type of connections and fasteners used to secure the foundation's structural elements. Provide measurements of the various elements. Relate the location of the foundation system to the structural bays described in the previous paragraph. Also note all inaccessible areas.
- c. External structure:
  - Walls
 

Note the type of wall, e.g. balloon frame, concrete walls, etc. If possible determine the section of the wall. For example, the dimensions of the exterior cladding, the interior and exterior sheathing, stud, top and bottom plate, etc., should be given in the case of a wood frame wall. Note dimensions of openings and their framing elements and other bracing elements. Observe the type and amount of existing insulation.
  - Roof
 

Note the type of roof supporting system, e.g. rafters with ties, roof trusses, etc. Determine the configuration and orientation of the trusses, if applicable. Record the dimensions of the elements. Also note the types and dimensions of connections and fasteners. If possible, determine the roof layer construction. Give type, location and dimensions of all elements that pierce or rest on the roof, such as chimneys, stack vents, pediments. Also note the size, spacing and orientation of the elements supporting the top storey ceiling, other than trusses' bottom chords.

- d. Internal structure:
  - Bearing system
 

Note the type of bearing system, e.g. post and beam assemblies, bearing walls. Relate their orientation and location to the structural bays described in paragraph a. "General." If possible, determine the types of connections and fasteners. Note dimensions of each element.

- **Floor**  
Note the type of floor, e.g. wood, concrete, etc. If possible, determine the orientation of the joists by relating them to the interior bearing system. Locate bracing elements such as bridging or lacing. When possible, obtain dimensions.
- **Stairways**  
Note the type of stairways, i.e. wood stringers and treads, steel stringers and composite steel-concrete treads, etc. Identify the location of the stairway. Observe fastening details. Give dimensions.



*Stairway, Robert Service Cabin, Dawson, YT*

e. **Associated Features:**

Period engineering features such as tie rods transferring beam load to a roof truss, mortar sound deafening in floors and ventilation flues built in masonry cavity walls were once used in construction practice. The examiner should note these features and other design aspects that were particularly innovative, unique or successful and which may contribute to the overall significance of the building.

### 3.4 STRUCTURAL ENGINEERING ASSESSMENT

Note the structural condition of the building following the same order as above. The state of the overall stability of the structural system is of prime concern. The examiner should investigate structural weaknesses which may affect the stability of the system. It is also important

to identify the causes related to the structural condition, in order to determine the proper corrective measures.

#### 3.4.1 Investigating the Conditions

When investigating the condition of the structural system, the examiner should look for:

- fissures
- evidence of movements, deformations, displacement, settlement
- failures
- material deterioration and defects
- fire damage

Fissures are most often located around openings in the exterior walls of the building. The external fissures should first be investigated and their patterns traced on the proper elevation drawings. Then the examiner should proceed with the internal fissures. By relating the interior and exterior drawings, the examiner may determine the severity of the fissures. This procedure applies especially to masonry walls, as fissures usually do not appear in a frame wall construction with exterior cladding. The examiner should report other important fissures located on the interior walls and floors.

Evidence of movements of a structural element or system may be defined as the deviation from its original alignment. Structural elements such as beams will deform slightly under normal loading. When movements can be detected visually, it is of concern and should be recorded. Deformations are often interrelated. For example the deformation of a floor may be linked to the deformation of a supporting beam. It is important to identify these interrelations while on site, since movements may occur about several directions on one element and have different interrelations about each direction.

Failures of a structural system, elements and connections should be reported and described. In most instances, deformation is usually a good indication of the type of failure, e.g. buckled column. But local buckling, shear and compression failures may exhibit local deformations only. Therefore it is important that the examiner make a careful inspection to uncover evidence of failures.

## a. Wood:

The examiner should note all signs of material deterioration and defects. When investigating wood elements, the examiner should report fungal and insect activity, weathering, abrasion, impact damage and material defects such as knots which impair the structural quality of the elements. To determine the extent of deterioration, in the cases of fungal and insect activity, it is important to probe the wooden elements. Although fungal and insect activity can usually be detected visually from the presence of mushrooms, rot or frass, these may occur within the elements and remain undetected. This often occurs at the ends of wooden elements embedded in damp masonry. In such instances, the examiner can use an increment borer and take several samples. For more information relating to deterioration and defects of wood, refer to Vol. VI.5 "Conservation of Materials – Wood."

## b. Masonry:

When investigating masonry units and mortar, the examiner should note spalling, cracking, salt damage, abrasion, impact damage, efflorescence and stains. For more information relating to the description and defects of masonry, refer to Vol. VI.2 "Conservation of Materials – Masonry."

## c. Concrete:

When investigating concrete elements, the examiner should note, spalling, cracking, excessive air pockets, honeycombing, salt damage, abrasion, impact damage, efflorescence and stains. For more information relating to the deterioration and defects of concrete, refer to Vol. VI.1 "Conservation of Materials – Concrete."



*Strait's Second Hand Store, Dawson, YT*



## d. Metal:

When investigating metallic elements, the examiner should note evidence of atmospheric corrosion, galvanic corrosion and material defects. For more information relating to the deterioration and defects of metals, refer to Vol. VI.4 “Conservation of Materials – Metals.”

As needed the examiner should determine the location and extent of fire damage.

3.4.2 *Investigating the Causes*

Once the structural weaknesses have been identified, the examiner should investigate the causes. A poor construction detail such as a missing dampproof course is often the cause of rotten sill logs or wall plate. Poor workmanship and lack of construction knowledge may also account for the building’s structural condition. For example, at the turn of the century little was known about building on permafrost. Today, as a result, many of the period buildings in Dawson, YT, have deformed severely.

The examiner should investigate foundation movement. Soil tests may be required to determine the soil bearing capacity, water table and in the case of clayey soils, the extent of consolidation.

It should be noted that the condition of a system or element may affect the condition of another system or element. For example, movement in the foundation system will cause deformations in the walls and floors of the superstructure. Moreover, one condition of an element may be responsible for another condition related to that same element. For example, a wooden post may have failed due to a loss in compression strength resulting from fungal activity. It is important to investigate those interrelations while on site.

Very often historic buildings have served different functions over the years and have been renovated accordingly. These alterations sometimes have weakened the structural system. It is important to locate and understand these changes. Background information such as historical and archaeological findings may sometimes provide a clear understanding of the alterations. Take note of any evidence of alterations or additions, as these will provide more information and verify background information.

## 4.0 CONTENTS OF A GENERAL ASSESSMENT REPORT

Once the on-site investigation has been completed, the examiner should summarize and synthesize the data into a report.

The primary goal of a structural engineering general assessment report is to provide a clear overview of the historical and physical conditions of the structure under consideration. The report should correlate the results of the investigation of the structure with other available relevant information (e.g., historical reports and soil analysis reports).

The organization and format of the structural engineering general assessment report can be developed separately or it can form part of a larger report, including architectural information, mechanical engineering information, etc. This section contains a suitable format and organization for a joint report. If the engineer’s report is separate, it can be organized in the following manner:

- a. project context
- b. sources of data (technical data: geotechnical, climatic, seismic, set of plans, structural history, field test and lab test results)
- c. historical summary (site and setting)
- d. general information on structural elements and systems
- e. description
- f. assessment of condition
- g. conclusions and recommendations

The order of description for “e” and “f” should follow the sequence of examination outlined in sections 3.2 – 3.4.2 of this publication.

Within each section, observations should be limited to important aspects of the building and not to all characteristics recorded during the investigation. The engineer should draw attention to basic structural deficiencies which may affect plans for protection and development. After having completed the assessment, the examiner should recommend further areas of investigation and conservation treatment. For the latter, the investigator should distinguish between the immediate requirements designed to halt the active forces of deterioration and the requirements for long-term development, designed to enhance the significant aspects of the building.

In each case, a Class “C” estimate may be included.

*Illustrations are the property of the Heritage Conservation Program, unless otherwise noted.*

# **VOLUME III**

# **HISTORIC SITE**

# **ANALYSIS**

## **5.2**

## **STRUCTURAL ENGINEERING ANALYSIS**

## **STRUCTURAL DIAGNOSIS**

PRODUCED BY:  
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ORIGINAL DRAFT: L. FONTAINE



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6.0 BIBLIOGRAPHY

## 1.0 INTRODUCTION

This article will attempt to describe a systematic approach to the task of structural analysis and diagnosis of existing buildings. The structural analysis and diagnosis section is part of the conservation engineering methodology and process which develops in the following steps: investigation, analysis and diagnosis, therapy and maintenance.

For the purpose of this report, the concept of structure is restricted to buildings. The analysis and diagnosis of structural systems will focus on the following:

- stability: a performance based analysis and diagnosis
- loading conditions
- actual strength of materials
- modelling of aging period structures

Persons attempting to analyze historic structures must have a thorough understanding of the principles of structural engineering, structural behaviour and period materials, familiarity with architectural practices and some knowledge of the history of building technology of the period. Basically, such analysis and diagnosis must be carried out by professionals having the qualifications to take responsibility for the resulting allowable loads.

## 2.0 STABILITY – A PERFORMANCE BASED ANALYSIS AND DIAGNOSIS

The purpose of a stability analysis and diagnosis is to determine the load-bearing capacity of historic structures. It must take into consideration various regulatory demands, the demands on the structure and factors concerning the structure itself.

The strict application of current codes to existing structures can have a devastating effect on heritage buildings. Contemporary code requirements were developed to ensure safety at a reasonable cost; however when applied to existing structures, the cost will likely be prohibitive. As well, applying contemporary codes can destroy priceless fabric of the historic structure. Since 1985, the Canadian National Building Code allows for the performance of a structure to be a key factor in determining the bearing capacity of a structure.

As indicated in Appendix A, Article 1.1.2.1 “Application to Existing Buildings” of the current Canadian National Building Code (NBC), the focus is now on meeting the objective of the code as opposed to meeting the requirements. This article under-

lines the importance of understanding the objectives and the intent of the code, and balancing these objectives with the cost.

Article 1.1.2.1 of the NBC refers to the Canadian Building Digest No. 230 (NRC), *Applying Building Codes to Existing Buildings* for more information on the application of Code requirements to existing buildings.

The structural section of the Digest No. 230 implies the use of structural performance in the evaluation process.

Where a building has been standing for many years, and its condition or its relationship to adjacent buildings has not changed significantly, one may consider the building to be field tested. If a roof has withstood the effect of snow and wind for 50 or 60 years and shows no sign of distress, one may reasonably assume that it will continue to provide adequate service. The same may be assumed for walls in relation to wind loads. Earthquake loads are more difficult to assess on this basis because of their irregular occurrence. Nevertheless some assessment can be made in light of the recorded seismic activity of the area where the building is located.

Therefore, if structural calculations indicate underdesign results, the engineer does not have to condemn the structure. The structural assessment results based on the lifetime performance of a structure could even overrule the theoretical assessment.

The use of in-situ performance to assess the structural capacity of a building is the hinge of the structural conservation process. The evaluation process is cyclical: investigation — analysis — diagnosis. At the diagnosis stage, the theoretical results must be consistent with the observed performance in-situ. If they are not consistent, then assumptions must be revised and possibly, more investigation will need to be done. Re-evaluation of assumptions and extension of investigations will have to be done as often as required to reconcile theory and in-situ performance.

Interpreting the results of the condition assessment involves putting together: loading test, theoretical analysis, experimental model, in-situ and lab tests.

Assembling these results could lead to a review of the evaluation assumptions. For example, does the structural model need to be redefined? Are the initial assumptions for the loading condition and the in-situ strengths too conservative? Should safety factors be reconsidered?

Reconciling theory and performance is certainly the paramount element of the application of NBC to existing structures. It is a new challenge to the engineer because he or she must use considerable judgement to relax the particular requirements of the Code without affecting the safety level. It is definitely more time consuming to assess an existing structure; however, optimizing the strength of a structure usually saves on conservation costs in the end and, most importantly in the conservation field, it minimizes the impact of contemporary intervention on historic fabric.

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### 3.0 ASSESSMENT OF LOADING CONDITIONS

Historic structures, their components and joints must be analyzed in the context of the loads which they carry and the forces they must resist. Since stresses have lasting effects on building materials, the engineer must investigate the magnitude of loads which were carried by the structure in the past and also, the length of time the loads were acting on the structure.

Loading conditions should include: dead loads, live loads (use and occupancy; snow, ice and rain; wind; earthquake; impact and vibration; resonance and sway), etc. The engineer must refer to the latest version of applicable codes and Canadian Standards Association (CSA) for prescribed loads, load effects and combinations for specific material.

Loading conditions should be based on the user requirements and the selected function of the structures. If the selected function remains unchanged or results in a decrease in the loading, and if the performance of the structure is satisfactory through a period, the structural systems should be adequate.

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### 4.0 ASSESSMENT OF THE ACTUAL STRENGTH OF MATERIALS

The actual strength of materials should be defined based on the interpretation of the investigation results and the CSA standards. In-situ tests, laboratory tests, deformation analysis and CSA Standards should be correlated to define the strength limit state and the serviceability limit state which refer to the maximum load-carrying capacity of the period materials.

The purpose of in-situ tests, followed by laboratory testing, is to determine with reasonable accuracy the type of materials used for the construction of the structure, the basic properties of the materials used and the condition of such materials. Evidence of fire, excessive moisture content, infestation and other signs of material deterioration should be noticed and their effects on materials' properties, evaluated.

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### 5.0 MODELLING OF AGING PERIOD STRUCTURES

Modelling of aging structures should take into consideration the following:

- deformation of structures (see Section 5.3, "Structural Deformation")
- variable tightness of connection
- rigidity of assembly
- physical and mechanical properties of material
- dislocation of joints

Load distribution and pattern, and strength of material should be determined initially and reassessed after the first round of calculations if the theoretical modelling and analysis are not consistent with the observed performance.

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# **VOLUME III**

# **HISTORIC SITE**

# **ANALYSIS**

## **5.3**

## **STRUCTURAL ENGINEERING ANALYSIS**

## **STRUCTURAL DEFORMATION**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
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ORIGINAL DRAFT: P. STUMES

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## 5.0 BIBLIOGRAPHY

## 1.0 INTRODUCTION

Structural deformation is a prevalent condition of old structures. Structural deformation can lead to gradual or sudden collapse. Under less serious conditions, it can reduce the load-bearing capacity of the structure.

Structural deformation may manifest itself in many forms:

- a. dimensional changes of structural elements in any direction, such as swelling, shrinkage, increased or decreased cross-sectional area, elongation or contraction;
- b. deviations from original alignment, such as sagging, bowing, twisting, leaning or bulging;
- c. deviations from structurally correct relative positions, such as misalignment of parallel members or changes in the original relative angles between connecting members;
- d. dislodgement at joints of connecting members; and
- e. discontinuity of structural elements, such as the fracture of materials or the development of cracks or opening up of joints between bricks or stones.

Analysis of structural deformation is the process of investigation and understanding deformations, measuring their extent, determining their causes and interpreting the consequences. This article is a condensed guideline for persons who are responsible for engaging professional assistance to carry out structural deformation analysis of historic structures.

## 2.0 RECORDING OF DEFORMATIONS

### 2.1 METHODOLOGY

The survey of the historic asset must be carried out concurrently with a review of plans, drawings and other records. The structure and its elements must be compared to the plans. While ideally the observed dimensions and configuration should correspond with that of the plans, the surveyor must realize that occasionally the plans are incorrect and the structure was erected differently.

Certain conditions which appear to be deformations may not be that at all. Artistic concepts, functional necessities or unusual construction techniques can make structures appear to be deformed.

### 2.2 ANALYSIS

When accurate as-found measured drawings or photogrammetric records are available, most of the deformation can be identified and quantified from those records. Details should be reconfirmed on the site.

Surveyors must establish or confirm benchmarks or other survey markers outside the structure and relate major deformities to these benchmarks. If this is not done, the surveyor might relate dimensions to deformed lines or angles and then a correct line may be conceived as faulty.

### 2.3 INSTRUMENTATION

Visual inspection is most commonly used to analyze or survey deformities. Visual observation can be influenced by many factors and should be combined with as precise measurement as is needed to meet the project requirements.

Distances can be measured with simple tape measures, infrared distance meters or other instruments. Very short spaces, such as thickness of materials, may be measured with vernier calipers, micrometers, dial gauges and similar instruments. Angles may be measured with fixed squares or with squares combined with adjustable protractors or with a Precision Inclinometer. True horizontal and vertical are observed with various spirit-levels, plumb bobs and other types of leveling instruments.

Distances can be measured directly off the object or indirectly off photographic images, that is, by photogrammetry or rectified photography.

Specialists engaged in measuring complex deformation must be experienced in the use of optical instruments, such as theodolites, optical levels and the like.

### 3.0 MONITORING DEFORMATION

Survey of deformation should be carried out during several seasons of the year. This is necessary for many reasons:

- a. the soil conditions can change from season to season and the upheaval or settlement of soils may cause deformations of varying degrees;
- b. environmental variations during the seasons, such as freezing, high heat and humidity, can cause changes in deformation;
- c. changing loads, such as installation of exhibits or increased visitation, may cause variations in the deformation; and
- d. seasonal and progressive movements have a constant effect on deformation.

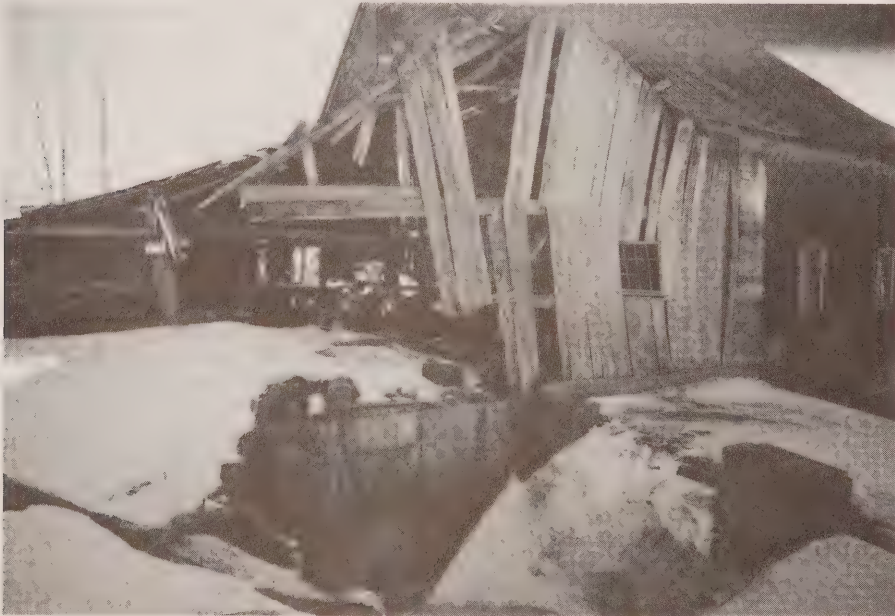
The variation of deformation may be observed by securing marks on the structure and measuring the distances between marks at different time periods.

All observed deformations must be accurately recorded, including the deviations from the normal angles and the measured sizes of deviations. Angular deviation is expressed in degrees (minutes and seconds). Deviations in dimensions should be expressed in metres or millimetres.

Whenever possible the numerical reports on deformations should be accompanied by drawings or photographic representations. On such visual reports the location of measurements taken and the numerical results of measurements should be indicated.

### 4.0 DEFORMATION ANALYSIS

Structural deformation analysis reports must contain firstly, the analytical assessment of the amount of deformation and secondly, the probable causes of deformation.



*Bellrock Mill, Kingston, ON*

#### 4.1 TIMBER STRUCTURES

The most common types of deformation of timber structures are:

- walls out of plumb
- horizontal members not level
- members, which are loaded in bending, are sagging
- vertically loaded members are bent
- disconnected joints, loose fasteners
- horizontal joists disconnected from walls

The most common causes of deformations are:

- foundation failures
- excessive loads, insufficient supports
- inadequate or missing bracing
- defective material or inappropriate species of wood
- creep, due to long-term loading
- changed loading conditions, (especially changed roof coverings)
- gable roof rafters are pushing walls apart
- corrosion or loosening of metal fasteners
- shrinkage or swelling of wood
- decay of timber, especially ends of horizontal members resting on masonry
- decay of ground sill
- removed intermediate supports
- fire

#### 4.2 MASONRY STRUCTURES

The most common deformations of unit masonry structures are:

- walls out of plumb
- walls bulging
- bowing of wythes
- fractured lintels
- disarray of arches
- bulging or splitting columns
- separation of bricks or stones at mortar joints
- cracks through bricks or stones

The most common causes of deformations are:

- foundation failures
- insufficient inherent strength of bricks or stones
- unsuitable mortar in joints, loose mortar bonds
- collapse of fill in cavity walls
- overloading
- inadequate design details or faulty construction
- lack of expansion joints
- eccentric loading
- horizontal pressure
- disengaged horizontal restraining members
- deterioration of masonry-ties
- expansion of corroded ferrous metal inserts
- water damage: wetness caused by capillary action, water penetration from roof, water percolation through walls due to differential vapour pressure, frost, re-crystallization of salt deposits
- slow earth movements and earthquakes

#### 4.3 ANALYTICAL REPORTING

The results of surveying deformations of historic structures should be presented in an analytical report. Such a report should contain a description of the structure to include:

- a. pictorial representation using drawings, photos and other documents of the location, extent and appearance of deformations;
- b. a quantitative report on the extent of deformations, providing numerical data and identifying seasonal and progressive movements;
- c. listing of most probable cause of deformations, both known and assumed; and
- d. identification of potential consequences of deformations.

The information obtained through the analysis of deformation will be one of the pieces of information which will be used for the analysis of structural systems which in turn is part of the fuller analysis of the entire heritage resource in its context within its site (See Section 5.2).



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# **VOLUME III**

# **HISTORIC SITE**

# **ANALYSIS**

## **6.1**

## **INVESTIGATION AND ANALYSIS OF SITE SERVICES**

### **PERIOD PLUMBING AND DRAINAGE**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
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ORIGINAL DRAFT: COMMONWEALTH HISTORIC RESOURCE MANAGEMENT LIMITED

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## 1.0 GENERAL REMARKS

The detailed investigation, analysis and assessment of period water distribution systems, plumbing and sewage systems and drainage systems provides an understanding of the potential for adaptation and renovation of existing services and provides background information for asset management.

The scope of the analysis of period plumbing and drainage systems depends upon the limits of time, trained personnel and financial resources. For further details on scope, see Section 1 "Categories and Levels of Analysis" and Section 2 "Determination of Scope."

As applied to period plumbing and drainage, the four levels of analysis break down into:

- a. Level "D," a brief overview and simple description of the systems and fixtures (useful for planning purposes);
- b. Level "C," a selective investigation and description in general detail, primarily for anticipated maintenance or stabilization work;
- c. Level "B," a detailed and complete investigation of the systems and fixtures as described throughout this article, (desirable for all predesign development of historic sites and structures); and
- d. Level "A," an exhaustive study, analyzing the systems from several perspectives and in considerable detail, recommended only for special circumstances when the plumbing system itself is of special significance.



*Bathroom: 1924 Standard Catalogue*

When the investigating engineer or architect is faced with questions concerning configuration and condition of such systems, it is good practice to turn to professional inspectors who have the technical training and experience in analyzing such systems. When faced with questions concerning the original layout and subsequent alterations, it is good practice to turn to specialist historical researchers, conservators, curators and industrial archaeologists who have a broader exposure to the history of plumbing systems.

In general, the investigation and analysis should be co-ordinated with other predesign studies and monitored by a project team. Additional recording and analysis is warranted for research and archival purposes whenever potentially significant period plumbing or drainage systems must be removed or extensively upgraded for use. The equivalent of as-built drawings should be prepared for all existing systems prior to replacement.

## 2.0 PREPARATION FOR THE INVESTIGATION

To prepare for the investigation, see Section 4 "Architectural Analysis," which sets out requirements for reviewing background information, assembling equipment and so on.

For a summary of information on relevant period technology, see Vol. VII.13.1 "Period Servicing: Plumbing and Drainage."

### 2.1 TERMS OF REFERENCE

Ensure that the investigator has a sound knowledge of basic plumbing theory, principles of hydraulics, building codes, safety requirements and the history of plumbing and drainage systems in North America. Some expertise in the maintenance and repair of historic plumbing and drainage systems and their components is also desirable.

Identify the planned level of intervention of the site. A restoration will require a more detailed investigation than will stabilization. Identify the resources which are available.

Establish a schedule for the investigation to co-ordinate it with other specialists and work on the site.

## 2.2 EQUIPMENT

Make arrangements for any special equipment which may be needed. The following equipment and tools are useful for the investigation of plumbing services:

- rulers
- measuring tape
- marking or scratch awls
- level
- plumb bob
- saws
- scrapers
- chisels
- chain vice
- pipe cutters
- pipe threaders
- pliers
- 35mm camera
- video camera-recorder
- notebook
- knife
- bicycle spoke
- dental mirror
- magnet
- files
- tube cutters and reamers
- pipe reamers
- T-handle wrenches
- wrenches – basin, pipe, adjustable

## 2.3 DOCUMENTATION

Compile a fieldbook which includes extant fieldnotes of the systems, relevant historical and archaeological data and summaries of relevant architectural and engineering reports. The investigator should prepare checklists for the analysis after an initial site visit and after having studied background material.

Collect and study research notes and other evidence such as as-built and as-found drawings.

For the contents and preparation of the Report, see Section 4 “Architectural Analysis.”

## 3.0 PLUMBING SYSTEMS

A plumbing and drainage system consists of a source of water, its distribution through the site and structure and its proper drainage. This is a complex hydraulic system which consists of pipes, fittings, vents, traps, valves, tanks and fixtures. The first task is to identify the nature of the system and to understand the interaction of its various parts.

Determine whether all or part of the system is in active use, whether the system contains pressurized water and whether it may contain potentially hazardous products or fumes. Make a note of environmental conditions or physical constraints which may affect system performance.

### 3.1 WATER SUPPLY

#### 3.1.1 *Source*

Locate the source(s) of water supply. In rural areas this may be from wells, ponds, rivers or cisterns. If the source is a well, determine whether it has been dug, bored, driven or drilled. The upper portion of shallow-dug wells (under 8 m) may be lined with preformed cement, brick or stone to exclude surface water. Determine the condition of the pumping or lifting apparatus and the piping.

A cistern for storage of rain water may be located underground, in the attic or on the roof. Locate it and record its condition.

If the source is a central or municipal water supply, locate the mains. They will often be in the basement at the front of the building, perhaps under the walk or driveway. Street pressure is usually sufficient to distribute water without the need for a pump. Water mains must be buried below the frost line. The shut-off valve and water meter should be close to the point of entry. It is good practice to check that the grounding wire from the electrical system is on the public side of the water meter.

Determine the metal from which the entry pipe is made. Lead pipe has a ball-type connection at the joints, has a soft grey colour and is easily scratched to reveal a shiny surface. If the entry pipe is lead, have the water analyzed for possible lead contamination.



### 3.1.2 Water Quality

The water supply should be tested for purity and for hardness. Samples may be sent to provincial or territorial health authorities or can be tested by a private contractor. The water should be tested even if it is not intended to be potable, because it may contain dangerous substances or may cause corrosion or blockage to the water distribution system.

Tests for the following impurities or conditions should be performed:

- a. total solids – organic (animal or vegetable waste) and inorganic (chalk, debris, etc.);
- b. ammonia – .08ppm of albuminoid ammonia from a shallow well indicates pollution from sewage;
- c. oxygen absorption measures the amount of organic material in water – 2ppm indicates impurity;
- d. nitrates indicate recent pollution;
- e. chlorine indicates urine or salty water;
- f. hardness is measured in degrees Clark – a reading of 20 or more indicates hard water; and
- g. highly acidic water (low pH) will corrode pipes and tanks – acid can be neutralized by filtering through limestone at source.

### 3.1.3 Water Treatment

Determine whether the following treatment procedures are an integral part of the water supply system:

- filtration through sand
- sterilization through use of chlorination
- softening where calcium salts are changed to sodium salts by adding lime or soda
- other chemical treatments

### 3.1.4 Water Pumps

Private water supplies usually require a pump to bring the water from the source into the distribution system. Identify the type of pump and its location, condition and power source. Check for signs of water. There are many types of pumps, such as:

- a. submersible, located underwater and used in wells more than eight metres deep;
- b. surface, located at the top of the well, in a pumphouse which must be heated or insulated to prevent the pump from freezing;

- c. displacement, which uses plungers fitted with fabric or leather cups and operated by hand, windmills or water wheels;
- d. rotary, self-priming with an electric motor;
- e. centrifugal, which can raise water approximately 4.5 m above the water level;
- f. hydraulic ram, which pumps clean water but runs on dirty water;
- g. plunger or reciprocating;
- h. turbine; and
- i. ejector.



Well, Fort Anne, Annapolis Royal, NS

### 3.1.5 Storage Tanks

In some distribution systems, the water is pumped into an elevated storage tank and then fed by gravity throughout the building and site. Alternatively, a compressed-air system permits a smaller storage tank near the pump. Check the tank for possible leaks or signs of deterioration.

### 3.1.6 Hot Water Supply

Determine the location, condition and source of heat for the tank(s). Note the kind of system in use. In the cylinder system, the tank is located below the faucets. In the tank system, it is above them. In a demand system, heat is supplied to the pipe feeding the hot water faucet (without a tank) when the water flows. Note whether the hot water supply is local (for one sink or room only) or central. Inspect all tanks and heaters for signs of deterioration. Include the tank lining in the inspection. Check the local code requirements for capacity and for safety.

## 3.2 WATER DISTRIBUTION

Clean water is distributed through a system of pipes and valves to the various fixtures.

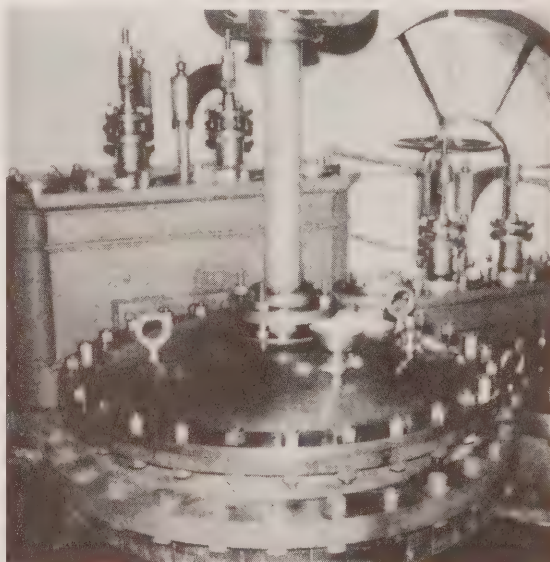
It is essential that the water supply not be contaminated by waste or by sewage gas. This may result from cross-connections which allow siphoning to occur or from leaky underground pipes. Tubs and sinks whose faucets extend below the overflow level represent a cross-connection. Any potential for cross-connection is a fault which must be remedied.

### 3.2.1 Pipes and Fittings

Inspect the piping to determine the materials used. The following materials may be used for the pipes, joints, fittings:

- a. Vitrified stoneware (clay), although fragile, was used in the nineteenth century.
- b. Cast iron was used for water main pipings and fittings and valves. Joints are usually caulked.
- c. Wrought iron was used for pipe fittings and occasionally for pipes. Joints are usually screwed rather than caulked.
- d. Copper was used for pipes and soldered joints. Only copper may be used under many current codes for supply pipes.
- e. Brass was used for fittings. It can be cast, rolled into sheets and drawn into tubes or wire.
- f. Galvanized steel is easily identified by threaded joints. It is no longer used because of its tendency to rust. Lower water pressure may indicate material is rusting from the inside out. Horizontal pipes of this material will rust more quickly than vertical pipes. Test the condition of the pipe with a magnet. A weak magnetic attraction indicates extensive rust.

- g. Lead was used in older pipes and in alloys and solder. It can be attacked by acids. A danger of lead poisoning exists.
- h. Wood was occasionally used for pipe, particularly in industrial uses and in the west.
- i. Oakum, a shredded tape or hemp fibre, was used for poured joints in water mains.
- j. Asphaltum, a water-proofing paint made from asphalt, was used to protect metal pipes from damp.
- k. Plumber's soil, lampblack mixed with glue and water, was used to prevent the adhesion of solder.
- l. Brick, in the form of square brick channels, was once used for drains. This system is not sanitary.
- m. Plastic pipe/polyvinyl chloride (PVC) or acetate buterate styrene (ABS) can be joined by solvent welding. It is resistant to corrosive fluids, but is damaged by ketones, aromatics, chlorinated hydrocarbons. This material cannot be used for hot water.



*Hamilton Pump House, Hamilton, ON*

### 3.2.2 Valves

A variety of valves are used to regulate water flow. These include a valve on the main supply service, stopcocks on the lines near the fixtures, ball-and-cock and flush valves for toilets and urinals, check valves to prevent reverse flow and shock suppressors to eliminate water hammer.

Pressure-reduction valves may be used if street pressure is too high. These are particularly useful if old plumbing is to be retained, but there is some question as to whether it can withstand normal municipal pressures.

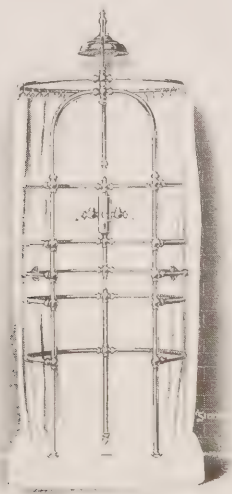
### 3.2.3 Cathodic Protection

Based on a hierarchy of metals, less “noble” metals (such as galvanized steel) will quickly corrode by galvanic action if hung or supported by fittings made with a more noble metal (such as copper). Corrosion may also occur if a system is composed of differing pipe materials.

Magnesium rods in hot water tanks will corrode before the steel tank. By inspecting the condition of the rod and replacing it as necessary, the life of the tank can be extended beyond its normal life expectancy.

## 3.3 FIXTURES

Sanitary fixtures consist of a basin or container for water and pipes, valves or faucets to distribute and regulate the flow of water. The most common fixtures are sinks, toilets, urinals, bathtubs and shower stalls. The basin may be made of porcelain, enamelled iron or steel, stainless steel or plastic. Faucets are made of metal or plastic and may be decorated with porcelain or another material.



*Fixtures*

Inspect the basin for cracks, crazing, chipped enamel rusting or other deficiencies. Determine whether the valves and faucets function properly, whether leaks occur in the pipes or at the joints and ensure that faucets and valves are properly fastened to the fixture.

## 3.4 LOCATING OLD LINES

### 3.4.1 Sound

Turn on one faucet at a time and listen to the water moving through the pipes. In many cases this will locate the lines with reasonable accuracy. Tapping exposed pipe will cause the remainder of the pipe to ring. This may be heard by putting an ear to the wall. A stethoscope will make this task easier.

### 3.4.2 Observation

It may be necessary to cut small exploratory holes in the walls, floors or ceilings to find the location of lines and to determine their materials and condition. The advantages of gaining this information should be weighted against the disadvantages of the damage done to the building fabric. Permission to open holes must be obtained.

### 3.4.3 Other Methods

Additional non-destructive techniques may prove useful. These include magnets (for iron pipe), metal detectors and X-rays.

## 3.5 WATER PRESSURE

Low water pressure may be caused by a partly closed valve, poor municipal pressure, piping which is too small in diameter or deteriorated pipes.

Check the appropriate building code for the minimum pressure required for supplying normal service and firefighting.

To test the pressure and thus the condition of the pipes, completely open the highest cold water faucet. Open a second cold water faucet on the same level. Note the drop in pressure. Repeat the process with the hot water and compare the drop in pressure between the hot and cold. If the drop is equal, it may indicate little corrosion or an evenly rusted galvanized pipe. Turn on a hot water faucet and a cold water faucet from another fixture. If there is a great drop in pressure, the problem is likely located in common piping which may need to be replaced.



Too much pressure may put undue strain on the pipes. The solution may be a pressure-reducing valve. High pressure and then rapid closing of valves may cause water hammer, which may eventually burst the pipes. This can be remedied by a shock suppressor or by a valve which stops the flow of water more gradually.

## 4.0 DRAINAGE SYSTEMS

A building's sanitary system is composed of both plumbing and drainage. Water enters a building under pressure, but is drained by gravity. In addition to sanitary drainage, buildings and sites must be provided with adequate drainage of storm water. The investigator must consider both of these drainage systems, which are usually separate, but are sometimes combined.

Before investigating drains, be particularly careful to determine whether hazardous products or fumes may be present. Hydrogen sulphide gas may be found in sewers.

The investigation of the drainage systems should start at the roof and should include both the sanitary and storm systems.

### 4.1 SANITARY DRAINAGE

#### 4.1.1 *Soil and Waste Pipes*

The main sanitary drain pipe (the "stack"), which leads to the main drain, is often a 10 cm cast-iron pipe. In recent alterations, it may be made of plastic pipe. Waste pipes are smaller, often between 40 to 75 mm. Holes in cast-iron pipes can be easily repaired since the pipe is not under pressure.

Lead waste piping may be found connected from small fixtures to the main stack. It is soft, easily deformed and more difficult to repair, but is not a health hazard.

Check each fixture to see that it drains properly and that joints do not leak.

#### 4.1.2 *Vents*

Vents at the roof are necessary for the sanitary drainage system to prevent water from being siphoned out of traps, allowing sewer gas to enter the building. Every fixture should be adequately vented. Its distance from the vent and the number of fixtures which may share a vent are dictated by building codes.

The vents are usually a continuation of the main and secondary waste stacks through the roof. The section which projects should be shorter than one foot or else warm moist air from the stack will condense, freeze and block the vent. Vents passing through uninsulated attics should be insulated to prevent frost build-up. Vent pipes are usually galvanized and so rust problems are not usually encountered. The flashing at the roof is a weak point in the roof system. Check for signs of water entry or other deterioration.

#### 4.1.3 *Traps and Clean-Outs*

A trap is a device in the waste outlet pipe which forms a barrier against gas entering from the sewer. It usually consists of a U-shaped bend in the pipe which remains filled with water. Water-sealed traps are preferable to older mechanical traps, which usually become ineffective after prolonged use. Traps, which are not larger than the waste pipes into which they are fitted, can be self-cleaning. Some traps, particularly the main trap, are fitted with clean-out. All traps should be accessible for inspection and repair.

Ensure that every fixture is trapped and that the overflow pipe from sinks and bathtubs is connected to the right side of the trap.

The water in the trap may evaporate if the system has not been used in some time and the water seal may also be broken by back pressure or a sudden discharge of water. Normal use will usually restore the water seal; if it does not, a trap primer may be needed.

Every fixture should be separately fitted with a trap, as should the drain from the main soil pipe. The waste from a fixture should not pass through more than one trap before reaching the trap in the soil-pipe drain.

In older systems, the traps may be back-vented to a "back-air pipe," which is separate from the main stack or to local vents in order to prevent siphonage. This double-pipe system is complicated. Newer non-siphoning traps are deeper and do not require back-venting.

The detailed investigation should determine whether the system is properly trapped and vented and whether any sewer gas can enter directly into a room. If so, this must be remedied.

Locate the clean-outs, particularly those in the main drain. Determine whether any have been opened recently, since this may indicate past problems. Clear any blockage.

#### 4.1.4 The Drain

The drain should be connected directly to the municipal sewage system, to a holding tank (which must be emptied regularly) to a septic-tank or to a cesspool system.

The drain pipe should slope at a minimum grade of 1:50. Blockage in the drain may be caused by a design fault or by the drain being clogged or cracked by debris, roots or frost-heaving. Clean or repair the drain, if necessary.

Some systems require sewage pumps to raise the waste to the sewage system. Ensure that the pump is in good working order.

#### 4.1.5 Septic Tank Systems

Septic tank systems consist of two parts: the tank and the disposal field. The tank holds the sludge and scum and should be cleaned and maintained regularly. Perforated pipes allow the effluent to percolate into the soil over the disposal field. The leaching bed should remain operative for 20 to 30 years. Check the soil over the leaching bed to determine whether it has reached a saturation point. If the system is completely plugged, the lowest fixture in the building will back up with contaminated water.

It is extremely important to note the relative location and distance between the local water supply and the septic tank and disposal field. Wells must be uphill at least 15 metres from the tank and 30 metres from the field to prevent contamination of the water. However, these regulations may vary on local authority.

Locate the inspection trap for the septic tank. Have a percolation test performed on the soil to determine its ability to absorb effluent.

#### 4.1.6 Cesspools

Cesspools or seepage pits are underground pits into which the sewage is delivered. The sides may be constructed of brick, stone or concrete rings which are often not watertight. Cesspools are frequently objectionable or hazardous and should be replaced with septic tanks. It is particularly important that they be a safe distance from the water supply.

### 4.2 STORM DRAINAGE

A properly designed drainage system must remove rainwater from the roof and exposed surfaces of a building and drain the water at a sufficient distance from the foundations to prevent seepage into the building.

In most jurisdictions, storm water must be drained separately from sanitary waste.

#### 4.2.1 Roofs

The roof must provide a waterproof system which allows water to run off freely. No obstructions should exist which will impede this flow. Investigate ridges and flashings at the hips, valleys and parapets, as well as the flashings at all projections through the roof such as chimneys and vents. See Section 4 "Architectural Analysis."



*Billings Estate Museum, Ottawa, ON*

On flat roofs, one or more unobstructed drains must be located at the lowest point(s). These drains may connect to the main stack or to a separate storm drainage system. Drains on flat roofs must be inspected regularly for possible blockage from leaves or branches.



#### 4.2.2 Eavestroughs and Downspouts

Sloped roofs are often fitted with eavestroughs (gutters) and downspouts (rainwater leads) to drain water. Eavestroughs can be a cause of ice dams in freeze-thaw winter conditions, so some designers prefer to omit them in the Canadian climate. Their omission is acceptable if the risk of damage from ice is greater than the risk of seepage into the cellar or the nuisance of dripping eaves. Electrical heat cables or wires above the eavestroughs may prevent ice build-up, but they are expensive to operate and require frequent maintenance.

Eavestroughs and downspouts may be made of lead, copper, galvanized steel, plastic or wood. Note the materials. The use of different metals may cause corrosion from galvanic action. (See 3.2.3 above).

Check all eavestroughs for leaks and corrosion and for weak or missing supports. Ensure that they maintain a uniform grade draining to the downspouts. Inspect them regularly for blockage from leaves or other objects and clean as required. Organic materials may collect. The acids formed by their decomposition can corrode metal eavestroughs or rot wooden ones.

Check all downspouts for leaks and corrosion and ensure that they are continuous and properly supported.

The downspouts should throw the water a sufficient distance from the foundations or else lead to a drain system, so that rainwater does not seep into the basement.

#### 4.2.3 Ground Drainage

An underground drainage system is often constructed around the periphery of a building. This usually consists of perforated pipe laid on a bed of gravel or other porous material. It may drain into a sump (in which water may be pumped or allowed to percolate) or into the municipal storm sewage system or (where permitted) the sanitary sewage system.

### 5.0 TESTING THE SYSTEM

The integrity of the plumbing and drainage system may be tested by one or more of several methods:

- a. Visual Test:  
Careful inspection will often reveal leaks in the piping, but is not likely to find faulty joints.
- b. Water Test:  
Run water through the system and check for leaks. This should be done only as a final test when the system is believed to be sound. If water under pressure enters a deteriorated system which has not been used for some time, it may cause damage to the system as well as water damage to the building fabric.
- c. Gas Test:  
Apply soap and water to joints in the drainage system. Bubbles indicate that gas is entering the system and escaping.
- d. Smoke Test:  
Seal all outlets and pump smoke into the system or insert a smoke bomb. This will reveal whether:
  - the system is gas-tight
  - traps have sound seals
  - every fixture is trapped
  - vent pipes are improperly vented into attics, chimneys or hollow partitions
- e. Pneumatic Test:  
Seal all joints and force air into the system with a pump which has a pressure gauge. By plugging the system at different points and observing changes in the pressure, it will be possible to determine where the rate of air leakage is greatest and therefore to locate areas of breakage.
- f. Peppermint Test:  
Pure oil of peppermint may be introduced into the pipes to check for leaks. This test may be misleading unless done with care by a skilled investigator.

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# **VOLUME III**

# **HISTORIC SITE**

# **ANALYSIS**

## **6.2**

## **INVESTIGATION AND ANALYSIS OF SITE SERVICES**

### **PERIOD HEATING AND VENTILATING**

PRODUCED BY:  
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## 1.0 INTRODUCTION

The detailed investigation, analysis and assessment of systems for heating and ventilating heritage properties provides an understanding of the potential for adaptation and upgrading of existing services and also provides background information for asset management if the existing systems are to be retained.

The scope of the investigation of period heating and ventilating systems depends upon the limits of time, trained personnel and financial resources. For further details on scope, see Section 1 “Categories and Levels of Analysis” and Section 2 “Determination of Scope.”

Research reports are usually designed to give managers and designers the basic information necessary to ensure the protection of period assets. Additional recording and analysis is warranted for research and archival purposes whenever potentially significant period heating or ventilating systems must be removed or extensively upgraded for use. The equivalent of “as-built” drawings should be prepared for all existing systems prior to replacement.

The investigation should be carried out in conjunction with the preparation of measured drawings, historical research, architectural analysis, engineering analysis and other predesign studies in preparation for conservation design and development.

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## 2.0 PREPARATION FOR THE INVESTIGATION

To prepare for the investigation, see Section 4 “Architectural Analysis.”

For a summary of information on relevant period technology, see Vol. VII.13.2 “Period Servicing: Heating and Ventilation.”

### 2.1 TERMS OF REFERENCE

The investigator should have a sound knowledge of basic mechanical services, the principles of heating and cooling, building codes, safety requirements and the history of heating and ventilating systems in North America. Some expertise in the maintenance and repair of historic heating and ventilation systems and their components is desirable.

Identify the planned level of intervention on the site. A restoration will require a more detailed investigation than will stabilization. Identify the resources which are available.

Establish a schedule for the investigation in order to co-ordinate it with other specialists and work on the site.

Make arrangements for any special equipment which may be needed.

### 2.2 DOCUMENTATION

Compile a fieldbook which includes extant field notes and drawings, relevant historical data and summaries of relevant architectural and engineering reports. The investigator should prepare checklists for the analysis, after an initial site visit and after having studied background material.

Collect and study research notes and other evidence such as as-built and as-found drawings.

For the contents and preparation of the report, see Section 4.0 “Architectural Analysis.”

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## 3.0 SOURCES OF HEAT

Traditionally, heat has been produced by the combustion of a fossil fuel and distributed through a building by radiation and convection. In early construction, principal rooms were heated individually with fireplaces or stoves. In kitchens, the sources of heat also provided heat for cooking. Stovepipe and chimney convectors may have provided additional distribution through the room. Secondary rooms were often warmed by heated air which passed through openings in the floor or walls, through stovepipes or from heat which radiated from or was conducted through chimneys.

The heating system also has to provide for the exhaust of combustion and toxic fumes, usually through a chimney.

In more recent buildings, a single furnace or boiler provides a central source of heat for the entire building or complex. In this situation, the distribution system becomes more complex and may be by means of air, steam or hot water.

Throughout history, buildings have been designed in response to local climatic conditions. Due to a combination of site selection, appropriate building materials and architectural forms, certain structures have interior spaces which are naturally cool in summer and warm during the winter. In some respects these inherent design elements served as passive solar heating systems.

Ventilation was provided primarily by means of windows and by secondary internal openings such as transoms. Chimney draughts also provided a measure of ventilation. Air cooling or conditioning was not attempted until the present century.

The first task of the physical investigation is to identify the nature of the system and to understand the interaction of its various parts.

Determine whether all or part of the system is in active use, whether the system functions correctly and whether it may emit potentially hazardous products or fumes. Note environmental conditions or physical constraints which may be affecting the system.

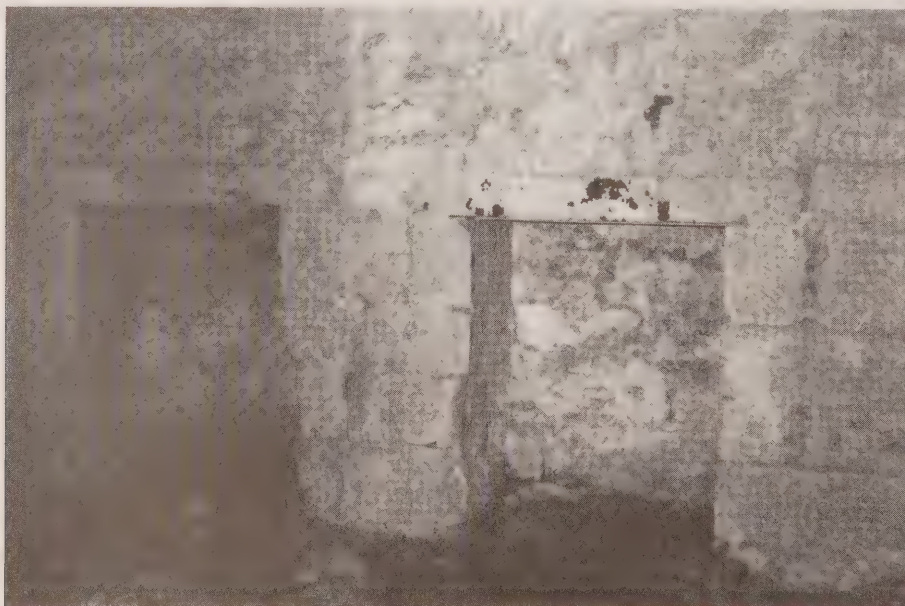
### 3.1 FIREPLACES

Fireplaces are commonly composed of four main parts: the firebox, the throat, the damper and the flue. When inspecting a fireplace, it is important to check for cracks in the masonry, particularly in the firebox and throat areas. If they require repointing, it is important that fire clay be used, since portland cement mortars will not withstand heat for long periods of time.

Dampers prevent cold air from entering the room when there is no fire and also regulate the air supply while a fire burns. It is important that they be able to move freely. Repeated heating and cooling may cause the damper to become brittle. Deposits of mortar can accumulate on its surface; therefore, it should be checked periodically. In addition, the ash pit and ash trap should be inspected to ensure that they are functioning properly.

In certain buildings, fireplaces have been fitted with gas or electrical inserts. Check the condition of the supply pipes and wires and ensure that the control knobs are in good working order and clearly visible at the front of the appliance.

All fireplaces require a flue, which serves as the air passage to the chimney. It is important that this part of the fireplace be well maintained, since mortar and bricks often deteriorate and other debris may have collected inside. Straight flues can be inspected by holding a mirror above the damper, whereas a sloped flue should be checked by lowering a burlap bag stuffed with paper and weights, on a strong rope. If there is a blockage, the length of rope which has been let out will indicate its location. Minor



*Fireplace, Lower Fort Garry, MB*

obstructions can often be removed by lowering heavy objects, such as iron window weights. Major obstructions may make it necessary to open the chimney. Fireplaces which have been converted to burn gas may require new flues or flue liners to meet codes and withstand the increased heat.



*Wood Stove, Robert Service Cabin, Dawson, YT*

### 3.2 STOVES

Stoves or space heaters have been used as the primary heating system in many older buildings. Fueled by wood, coal, gas, oil or electricity, they are usually made of cast iron, sheet steel or other metals. Each primary room may have its own stove, though modest buildings might have only one for the entire structure. Inspect all stoves on a regular basis to ensure efficiency and safety according to applicable codes. It is important to check the following:

- overall condition and previous maintenance
- closure of the doors or lids
- pipe condition, insulation and cleanliness
- functioning of damper
- adequacy of ventilation
- location in terms of distance from walls, furniture and floor coverings

### 3.3 FURNACES AND BOILERS

Central devices which provide heat for an entire building or a large number of rooms are commonly known as furnaces if they heat air or water and boilers if they produce steam. Hot-water furnaces are sometimes called boilers. A furnace or boiler typically consists of a fire pot, a combustion chamber and a radiator which transfers heat to the distribution medium. Furnaces may be made of cast iron, sheet metal, bricks or a combination of these and other materials. They may be heated by wood, coal, oil gas, electricity or by a combination of fuels.

It is important to identify the system, the make and model of the furnace or boiler and the type. This information, plus the age of the central unit and its service history, may indicate the feasibility of repair. Many boilers or furnaces are said to have a life expectancy of 50 years; however, regular maintenance will often extend this longer.

#### 3.3.1 Hot-air Furnaces

The kind of furnace is usually determined by its means of circulating warmed air (see below under Distribution of Heat).

The principal types are:

- a. Natural draft (or gravity) systems which are based on the principle that hot air rises. The simplest hot-air furnace is the natural outgrowth of the stove.
- b. An aspirating shaft system creates a draft through the furnace.
- c. In mechanical draft (or forced air) systems, a fan forces a greater volume of air into a space than is removed. These furnaces have filters to remove dust. The filters require regular changes.
- d. The furnace may be a combination system.

“Octopus” furnaces have been so named because of the shape of the ductwork joined to the bonnet. However, they are not a distinct type. They are usually operated by a natural draft.



### 3.3.2 Hot-water Furnaces

Furnaces (or boilers) which warm water may also be differentiated by type according to how they heat and distribute the medium. Open-tank systems are vented to the atmosphere, while closed-tank systems are not vented. Here water is under pressure and can be heated to a temperature above 100°C. An operational safety valve should be fitted to the tank. Circulation may be by gravity (in which hot water naturally rises) or by a mechanical pump.

### 3.3.3 Steam Boilers

Boilers always heat water under pressure. When inspecting a boiler, it is important to check for signs of corrosion, sediment deposits or leakage.

### 3.3.4 Central Distribution Systems

Heat, usually as steam, is sometimes supplied to a complex of buildings by a central source of heat and underground pipes. This is likely to be found in early industrial sites such as textile units or processing plants.

### 3.3.5 Inspection

When inspecting period furnaces, the following should be kept in mind:

- a. The furnace should be located on a flat brick or cement base near the coldest wall.
- b. A safe distance between the top of the furnace or bonnet (generally insulated with sand, loam or mineral wool) and the ceiling or wall must be maintained. If nearby joists are scorched, this indicates that the bonnet's insulation has failed.
- c. All joints must be gas-tight, particularly in furnaces with magazines which automatically feed solid fuels into the combustion chamber and where there is a risk of gas leakage.
- d. Inlet ducts to support combustion should be on the windward side of the building and covered with a galvanized screen.
- e. Draft regulators for the combustion chamber and the flue should be operational.
- f. Fire pots, made of either cast iron or steel, often have cracked linings due to expansion and contraction.
- g. Grates and ash pits should be checked.
- h. For oil furnaces, note the location and condition of the fuel tank. The pipes leading from the tank to the furnace should be well buried to prevent fire hazards.
- i. For gas furnaces, the chimney must have a flue liner capable of withstanding high temperatures. Also inspect the supply lines for signs of corrosion or a break in the seal.
- j. Fans and pumps should be checked for their mechanical condition and be maintained as needed.

## 3.4 CHIMNEYS

The chimney or the stovepipe conducts combustion gases into the atmosphere. Defects in the chimney can be hazardous because of the risk of fire and asphyxiation. The chimney inspection should include the following:

- a. Projection:  
The chimney should extend about 1 m above the roof and 0.6 m above any projection within 3 m of the chimney. The distances may be regulated by local codes.
- b. Cap:  
Check that the chimney cap is sound. The cap prevents draught and moisture penetration into the masonry walls of the chimney. The cap should extend beyond the chimney by 5 cm on all sides.
- c. Flashing:  
Proper flashing is necessary to deflect rain and snow away from the chimney. The flashing should be properly tucked into the chimney face.
- d. Mortar:  
From the exterior, cracks in the mortar will appear dark due to escaping smoke. Probe the mortar to see if it flakes, crumbles or breaks away in chunks. Small cracks will need to be repointed (see Vol. IV.4.1.3 "Stabilization of Masonry Structures – Repointing"). The mortar must be able to withstand expansion and contraction as the chimney heats and cools.
- e. Flue liners:  
A flue liner prevents the disintegration of the bricks and mortar from combustion gases. A variety of materials have been used for liners, including:
  - Ceramic tile: This is a traditional liner used by masons. The tiles should be at least 20 mm thick and the joints filled with air-setting refractory mortar. It is important that work be of high quality since it is difficult and expensive to reline a chimney with ceramic tile – a large part of the chimney must be opened.

- Steel liners: Even galvanized liners may rust within three years of installation. The soupy concrete mixes, which were poured around the galvanized pipe to stabilize it, often shrink while curing. The cavities trap moisture and expanding ice during freeze-thaw cycles may damage the chimney masonry and liner.

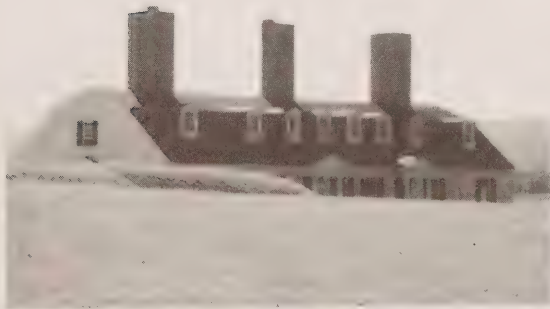
f. Leaning Chimneys:

Moisture, combined with the gases of combustion, produce chemical reactions which may cause the mortar joints to expand on the windward (and therefore wetter) side of the chimney. If the chimney is badly damaged, it will likely need to be rebuilt from the roof line, using a flue liner to protect the mortar.

Check that no floor joists tie into the chimney. A separation of at least 5 cm is normally required between the masonry and wood framing for safety purposes. Check local codes.

g. Efflorescence:

This white powdery crust is a sign of moisture migrating through the bricks and leaving salt deposits on the exterior. Warm moist air escaping from a faulty joint in the flue liner can condense under the cap and wet the bricks. Spalling may occur during temperature change cycles.



*Fort Anne, Annapolis Royal, NS*

### 3.5 ELECTRIC HEATING

In the past 100 years, electricity has been used as a power source for space heaters and furnaces and in hybrid furnaces with oil or gas. Since electricity is a relatively recent heating source, it is not described here in detail.

### 3.6 VENTILATION

The movement and exchange of air is necessary for health and comfort. Ventilation may be natural, by means of windows and transoms; as a result of chimney draughts or leakage and infiltration through the walls and other openings. It may be mechanically assisted by a fan. Forced-air heating systems ventilate as they heat. In warm weather, the fan may be used without the furnace for ventilation.

An exhaust system may be used to remove stale air from the inside of the building.

It is helpful to make diagrammatic representations of the ventilating system(s) whenever they were part of the original or subsequent design. Many buildings were originally designed to exhaust warmer foul air through special roof-top ventilators. In some cases the designed ventilating system included connections from the roof vents to each principal room. Public buildings, industrial buildings, agricultural buildings and the like, are likely to have elaborately designed original ventilating systems.

### 3.7 HUMIDIFICATION

Human comfort is dependent upon achieving the proper combination of temperature, humidity and rate of motion of the air.

Humidity may be introduced easily into forced-air systems by placing a pan of water in the path of the warm air. In a hot water and steam system, a wick or pan may be attached to the radiator. These evaporation pans may be refilled manually or automatically. Self-standing wick or rotary humidifiers are often used rather than a central system. Evaporation pans and supply systems may be checked for leaks, corrosion or malfunctions.

### 3.8 COOLING

Air may be artificially cooled in hot weather. Cooling may be effected by forcing air over ice or by blowing air past pipes which are cooled by mechanical refrigeration. The latter, which also reduces relative humidity, is known as air conditioning. This is a relatively recent system and is not treated in this article.



### 3.9 HEAT EXCHANGERS

A heat exchanger operates in reverse to an air conditioner. It removes heat from the building during the summer and adds it during winter. Heat pumps do not generate heat, but rather move it from one place to another. This is also a recently introduced system.

### 3.10 PASSIVE SOLAR HEATING

The design of many buildings contribute to their good thermal performance. Orientation, the placement of windows, the choice of building materials and other features maximize the natural sources of heating and ventilation and help buildings to be warm in winter and cool during the summer. These features comprise passive solar heating systems. They should be identified during the investigation and whenever possible retained in the conservation design and development.

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## 4.0 DISTRIBUTION OF HEAT

Heat from a central furnace is distributed throughout the building by means of heated air passing through ductwork or by hot water or steam circulating through pipes. In each case a control system regulates the temperature of the distribution medium (by means of dampers and valves). If the heated air is humidified, the control system may also regulate the humidity.

It is important to analyze the nature of the existing distribution system and to understand the controls which regulate it when it is considered for retention in subsequent development schemes.

### 4.1 HOT-AIR SYSTEMS

Heated air is circulated through the ductwork either by natural drafts and gravity or by a fan (see above). In the simplest kind of system, heated air is delivered only to the room directly over the furnace and passes into the other rooms by circulation through doors or "heat holes." In most systems, the air passes through ducts to each room. The outlet is through a register which may be fitted with a diffuser or a deflector. The air is usually recirculated through cold-air returns to supply the furnace. Sometimes the air supply comes from outside; this consumes additional energy since the air must be warmed more. To inspect the performance of an existing hot-air system:

- a. Turn up the thermostat and listen for noise or vibrations.
- b. Observe the operation of fans and pulleys, being careful not to get clothing or fingers caught in the mechanism. Note the capacity and shape of the fan.
- c. Look for signs of rust, corrosion, dirt and loose connections.
- d. Note the size and shape of the hot air stacks.
- e. Have the efficiency of the furnace rated.
- f. Check dampers to ensure that they are functioning properly. Adjustment may be needed to provide more even heat throughout the building.

A forced-air system can also provide central humidification and electronic air cleaning.

**Humidification:** Check for mineral deposits which may clog trays and pads, as well as the supply pipe. If the pipe is clogged, water will not shut off and may drip on the heat exchanger and lead to corrosion. For this reason, externally mounted humidifiers can cause less damage to the heat exchanger.

**Air Cleaners:** Electronic air cleaners are usually located in the return air duct. A filter removes larger pieces; smaller pieces are electrically charged and attracted to plates with opposite polarity. Check to see if parts are in working order.

### 4.2 HOT-WATER SYSTEMS

Heated water is circulated through pipes into radiators and then returned to the furnace. In smaller buildings, a simple gravity system is common. In larger buildings, a circulation pump is often used to ensure adequate distribution. In a one-pipe system, the supply to each radiator and the return from it branch off the same main pipe. In a two-pipe system, the supply and the return pipes are separate. An open expansion tank is sometimes placed at the top of the system to accommodate the change in volume of the water as it changes temperature. The tank requires occasional replenishment to replace water lost to evaporation. The expansion tank should not be allowed to freeze.

To inspect the system:

- a. check the pipes and fittings for leaks, corrosion or other defects;
- b. check that all valves function properly;
- c. ensure that the water temperature and pressure are appropriate;

- d. make certain the circulation pump operates properly; and
- e. check that the thermostat is properly calibrated.

#### 4.3 STEAM HEATING SYSTEMS

Steam circulates through pipes into radiators, condenses as it gives off heat and returns to the boiler as water. In a one-pipe system, the water returns against the flow of the steam. In a two-pipe system, the supply and return are separate.

Inspect the system as one would for hot water, being careful to check the pipes for cracks. Live steam escaping through a defect can be hazardous. Noise (called "water hammer") is a common problem, especially with one-pipe systems and may indicate inadequate drainage or the lack of provision for pipes to expand as they rise in temperature.

---

#### 5.0 TESTING THE SYSTEM

The integrity of the heating and ventilation system may be tested by various methods:

- a. Visual Test:  
Careful inspection of the system will often reveal problem areas.
- b. Pressure Test:  
A drop in pressure in a hot-water or steam system may indicate leaks.
- c. Temperature Test:  
If some rooms are warmer than others, the system will require balancing. Attempts to adjust uneven heating by regulating the circulation should be done on a windless day, since winds will cool the building differentially.

---

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# **VOLUME III**

# **HISTORIC SITE**

# **ANALYSIS**

## **6.3**

## **INVESTIGATION AND ANALYSIS OF SITE SERVICES**

### **PERIOD LIGHTING**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
OTTAWA (819) 997-9022

ORIGINAL DRAFT: COMMONWEALTH HISTORIC RESOURCE MANAGEMENT LIMITED

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## 1.0 ILLUSTRATIONS

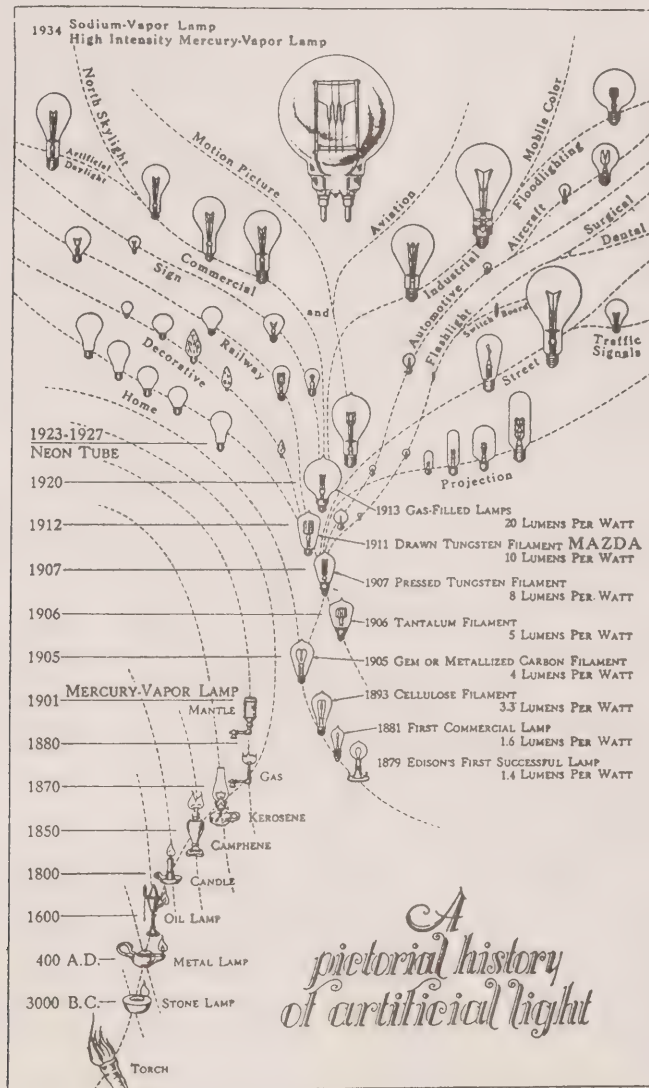
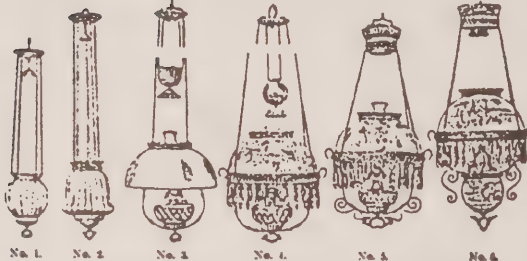


Fig. 1

# Lamp and Gas Fixtures.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

## Hall and Hanging Lamps.



Above cut represents six of our very best lamps. They are made for service as well as ornament.

- No. 1. Hall lamp, gilt lacquered chain and mountings, rose or ruby shade, \$1.45.
- No. 2. Hall lamp, larger size, gilt lacquered chain and mountings, rose or ruby, \$2.25.
- No. 3. Hanging lamp, glass fount, large-sized burner, 14-inch plain oval, dome shaped shade, weight balancer, brass mountings, \$2.15; with decorated shade, \$2.50.
- No. 4. Hanging lamp, glass fount, brass mountings, weight balance, decorated shade, 30 prism, \$1.45.
- No. 5. Hanging lamp, glass fount, with fine gilt lacquered frame, decorated and United shade, spring balance, \$3.00.
- No. 6. Hanging lamp, polished bronze metal, rich gold finish, improved spring extension, length closed 38 inches, extends to 72 inches, removable oil pot, handsome blue-finished 14-inch dome, shade and fount to match, hand-decorated, centre draught burner, 15 candle-power, can be lighted without removing chimney, 30 crystal prism, \$8.25.

## Hall Lamps.

With gilt lacquered chain and mountings, chimney and burner, complete, and very handsome globes, \$2.00 each.

Fancy brass frames, large fancy globes, large burner and chimney, \$2.50, 3.00, 3.50, 4.00 each.

## Vase Lamps.



- No. 1. Brass foot, large-sized burner, 7-inch dome shade, decorated to match fount, tinted glass, blue or yellow, complete with chimney and wick, \$1.25 each.
- No. 2. Brass foot, with 10-inch dome and bowl to match, large-sized burner, pretty decorations, complete with chimney and wick, \$1.75 each.
- No. 3. Brass foot, dome and bowl to match, removable fount, Climax burner, height 21 inches, beautiful decorations, a very handsome ornament as well as most serviceable article, special \$2.25 each.

Also a fine assortment of vase lamps, in newest designs, and at low prices, from \$1.10 to \$2.00.

All glass (vase lamp, oval, decorated globe and pedestal to match, brass fount, removable, and brass foot, climax burner, \$2.00 each.

## Banquet Lamps.



- No. 1. Embossed brass, with open-work foot, guaranteed, centre draft burner, complete, with new device for lighting, \$1.75, 2.00 each.
- Banquet lamp, No. 2, cupid pedestal, fount not detachable, silver or gilt figure, ornamental fount, centre draft burner, complete with chimney, \$2.50 each.
- Embossed brass, with onyx or handsome brass pedestal and open-work foot, with marble fount, centre draft burner, most beautiful designs, \$1.75, 2.00, 2.50 each.

## Glass Lamps.



- No. 1. Complete, with A burner, chimney and wick, 18c each.
- No. 2. Complete, with A burner, chimney and wick, 25c each.
- No. 3. Complete, with A burner, chimney and wick, 25c each.
- No. 4. Complete, with A burner, chimney and wick, 25c each.
- No. 5. Complete, with B burner, chimney and wick, 30c each.
- No. 6. Complete, with B burner, chimney and wick, 30c each.
- No. 7. Complete, with B burner, chimney and wick, 30c each.
- No. 8. Complete, with B burner, chimney and wick, 30c each.

Grid lacquerred, full size, open-work, cast heads, fine imperial or onyx pediments, with 15 candle-power burner, \$8.00, 1.00, 1.50, 2.00, 2.50 each. All banquet lamps are complete with 6-inch ring for shade or globe.

## Lamp Globes.



This style of shade has driven all others out of the market, and we have some very pretty decorations at prices ranging from \$1.50 to 12.00 each.

## Piano Lamps.

All gilt, onyx top, patent extension rod, with automatic fan-ometer, removable fount, round plain legs, complete with chimney, \$10.00 each.

Brass table, onyx top, removable fount, cast bowl and legs, \$11.00, 12.00, 13.00 each.

Wrought iron piano lamp, extending rod, removable fan-ometer, circular burner, automatic stop, complete with chimney, special, \$8.50, 10.00, 12.00 each.



No. 1.



No. 2.

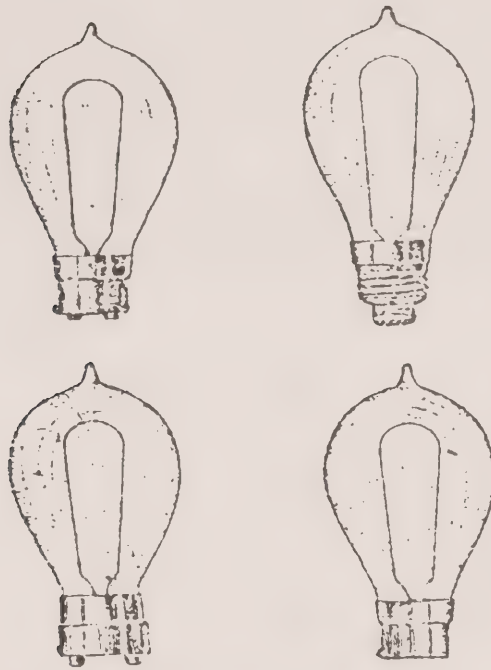
Glass bracket lamps, with large glass burner and chimney, \$10 each; with self-filling cap, 25c each; with self-filling cap and handle, 50c each.

Lamp brackets for above, No. 1, 25c.

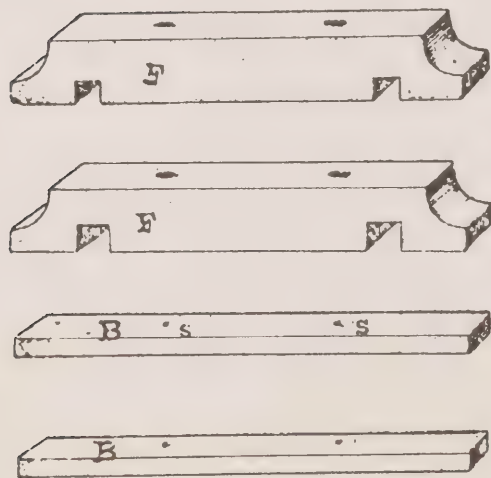
Bracket lamps, complete, as cut No. 1, 60c each.

Glass bowl decorated, colored glass pedestal, heavy iron foot, complete, with large burner, 50c each.

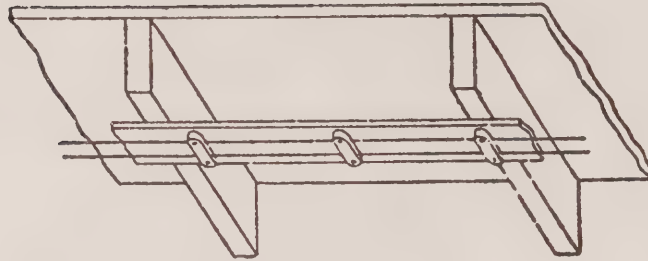
Fig. 1a T. Eaton Company Limited, Catalogue Fall and Winter 1899-1900



*Fig. 2 Combleat Incandescent Lamps*



*Fig. 3 Wooden Cleats*



*Insulators Mounted on Running-Board across  
Wide-Spaced Beams*



*Intermediate Support for Conductors between  
Wide-Spaced Beams*



*Methods of Supporting Small Conductors*

*Fig. 4*

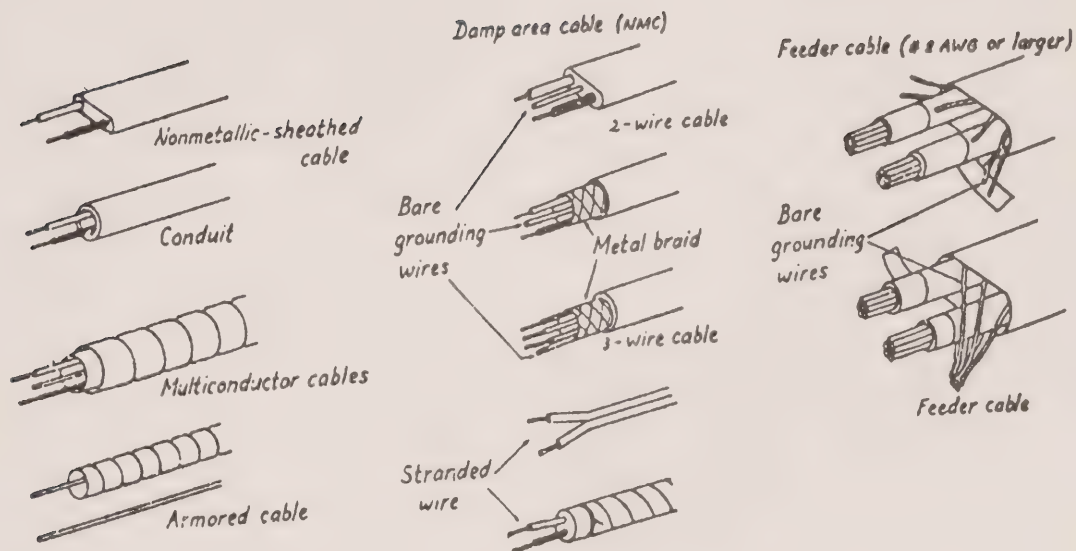


Fig. 5 Different Types of Cables

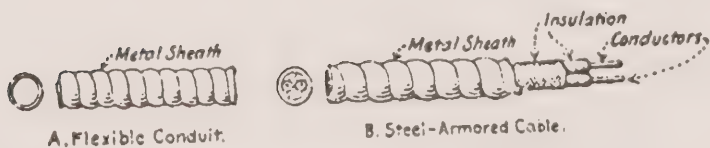


Fig. 6 Flexible Metallic and Flexible Steel Armored Cable



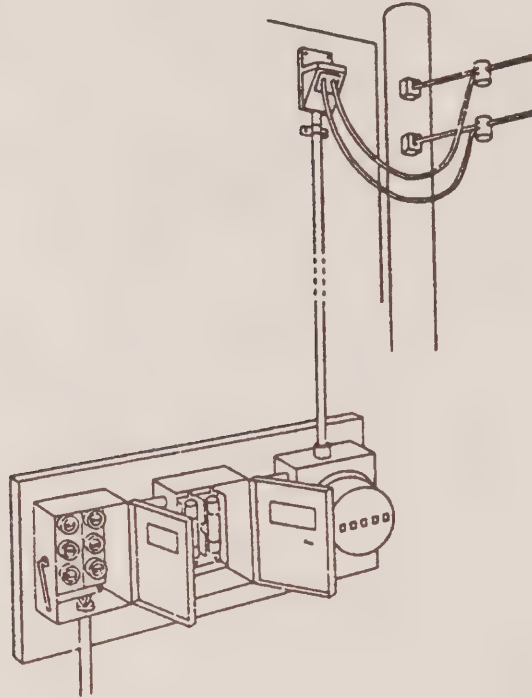


Fig. 7 An Electrical Panel

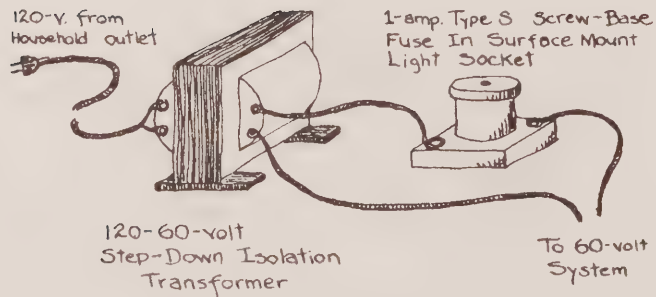
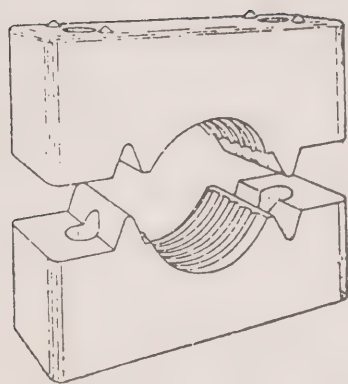
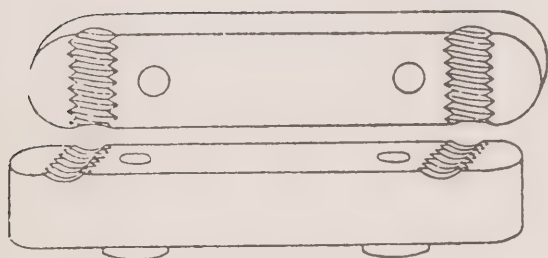
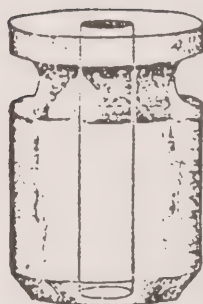


Fig. 8 Reducing the Voltage of a Circuit



*One-Wire Cleat.*



*Two-Wire Cleat.*



*Fig. 9 Porcelain Cleats and Knobs*

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Fig. 1 – A pictorial history of artificial light

Fig. 1a – T. Eaton Company Limited, Catalogue Fall and Winter 1899-1900

From: Loris Russel. *A Heritage of Light: Lamps and Lighting in the Early Canadian Home*, p. 284.

Fig. 2 – Completed Incandescent Lamps:

From: Edwin J. Houston, and A.E. Kennelly. *Electric Incandescent Lighting*, p. 136.

Fig. 3 – Wooden Cleats:

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Fig. 4 – Methods of Supporting Small Conductors:

From: Maximillian L. Ferro, and Melissa L. Cook. *Electric Wiring and Lighting in Historic American Buildings*.

Fig. 5 – Different Types of Cables:

From: Peter Jones. *The Electrician's Bible*, p. 28.

Fig. 6 – Flexible Metallic and Flexible Steel Armored Cable:

From: Terrell Croft. *Wiring of Unfinished Buildings*, p. 8.

Fig. 7 – An Electrical Panel:

From: Peter Jones. *The Electrician's Bible*, p. 9.

Fig. 8 – Reducing the Voltage of a Circuit:

From: *The Old House Journal* (November), 1978. p. 127.

Fig. 9 – Porcelain Cleats and Knobs:

From: Maximillian L. Ferro, and Melissa L. Cook. *Electric Wiring and Lighting in Historic American Buildings*.

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Rambusch Decorating Company  
40 West 13th Street  
New York, NY 10011  
(212) 675-0400

Rambusch of Canada Ltd.  
9005 Lise St.  
Richmond Hill, ON  
L4B 1G7  
(416) 485-5981  
Catalogue of lighting fixtures, church interior  
decoration services.

Old House Journal Catalogue  
2 Main St.  
Gloucester, MA 01930  
(508) 283-3200  
Periodical published by Old-House Journal.  
Important list of products.

San Francisco Victoriana  
Lighting Catalogue  
2070 Newcomb Ave.  
San Francisco, CA 94124  
(415) 648-0313

Toronto Fabricating Co.  
163 Sterling Road  
Toronto, ON  
M6R 2B2  
(416) 537-2516  
Cast-iron street lighting standards.

Valley Iron and Steel Co.  
29579 Awbrey Lane  
Eugene, OR 97402  
(503) 688-7741  
Cast-iron ornamental street lighting.

Victorian Lightcrafters Ltd.  
P.O. Box 332  
Slate Hill, NY 10973  
(914) 355-1300  
Solid brass lighting fixtures.

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# **VOLUME III**

# **HISTORIC SITE**

# **ANALYSIS**

## **7.1**

## **INVESTIGATION AND ANALYSIS OF**

## **MARINE AND INDUSTRIAL SITES**

## **PERIOD MACHINERY**

PRODUCED BY:  
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OTTAWA (819) 997-9022

ORIGINAL DRAFT: R. FAIRWEATHER

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## 1.0 INTRODUCTION

This article is written for technical and professional personnel trained in the inspection of machinery. It is intended to provide specialized information concerning the inspection of historic machinery and mechanical systems. It covers safety issues of particular concern for an inspector of such equipment, but it does not provide detailed information about the inspection itself. The article does, however, provide information on the preferred format and areas of coverage for a historic machinery inspection report.

Machines are usually allowed to deteriorate or are scrapped once they go out of service. They are specialized structures designed to do a specific job and have quite different maintenance problems from structures not designed to move or to control varying energy loads. Usually the specialized tools, the machines, the casting patterns and sometimes even the trades that were used to produce all or part of a historic machine have disappeared.



*MacDonald's Pumps, Hunker Creek, YT*  
Photo courtesy of A. Barbour

Since restoration resources are often severely limited, this guide will be organized toward gathering the most essential data first and progressively dealing with the more detailed information until a sufficiently comprehensive report is attained.

The field of mechanical engineering is so broad that the listing of all governing bodies in this section is precluded.

The relevant authorities may include:

- a. Department of Labour (federal or provincial)
- b. Workers' Compensation (provincial)
- c. Department of the Environment (federal or provincial)
- d. Health and Welfare Canada
- e. Fire Commissioner of Canada
- f. Local fire authorities
- g. Canadian Standards Associations (electrical code etc.)
- h. Provincial electrical codes
- i. Boiler Inspection Branch (of provincial governments)
- j. Department of Consumer and Corporate Affairs (elevating devices etc.)
- k. Department of Fisheries (federal or provincial)
- l. Department of Agriculture (federal or provincial)
- m. Department of Transport

Where inspection or examination of machinery falls under the jurisdiction of a governing body, it is the investigator's responsibility to ensure that requirements for the investigation or recommendations arising from the investigation do not conflict with the standards set by the authority having jurisdiction.

It is the policy of the Canadian Park Service (CPS) and of most museums that, if possible, historic machinery should not be operated. This would avoid severe wear, expensive maintenance, conservation problems or the loss of the machine.

However, if it is necessary to return a historic machine to active service, even for brief demonstrations, all applicable regulatory authorities must be consulted to ensure that no hazardous practice or incident occurs.

## 2.0 ORGANIZING THE INVESTIGATION

### 2.1 TERMS OF REFERENCE

The inspector responsible for preparing the inspection should review the terms of reference with the project manager and CPS machinery specialists. The terms of reference define and describe the exact nature of the job to be done, the limitations of the survey and the format for reporting the findings. It also provides work schedule deadline dates. Other information, that should be reviewed includes basic project objectives and functional restrictions of the machinery or the industrial plant that contains it.

## 2.2 BACKGROUND DOCUMENTATION AND INFORMATION

The inspector should gather documentation relevant to the investigation of the machinery. This information would normally be assembled in collaboration with the other specialists of the project team. It should include all historical and contemporary records which will contribute to an understanding of the machine's evolution, recent maintenance and present status.

This information may be obtained from several sources, including measured drawings, photo reports, Heritage Recording reports, historic trade literature, industrial and shop manuals and site investigation.

## 2.3 PRELIMINARIES

When an investigation is considered extensive or complex, the surveyor should make a preliminary visit to become reasonably familiar with the types of machinery before developing detailed work procedures and schedules. Take note of any items which require the assistance of technical specialists (e.g. industrial chemists to free spaces of gas and to oversee the removal and analysis of chemicals, or electrical or casting, welding and machining specialists). It is also important at the outset to identify items such as the need for cleaning of spaces, conditions of access, any removal of parts, doors and casings that may be required, location of services, protection from the elements, arrangements for the visiting public and locking off safety procedures.

## 2.4 SAFETY

Before inspecting any machine, ensure that the following conditions are met:

- a. Permission to come to the site and inspect has been obtained from the person directly responsible for the site.
- b. Wear a hard hat and protective clothing as necessary or required.
- c. Ensure that the following precautions are observed:
  - All compartments are freed of any dangerous fumes due to fuels, chemical storage, fungicides or engine exhaust. A sealed compartment should be checked for oxygen deficiency, possibly arising from rusting or from combustion.

- Any tank space to be entered should be emptied, steam cleaned, gas freed and filled with good air before entering.
- Any questionable compartment or tank space must be tested for oxygen deficiency and harmful vapours before entering. See Treasury Board's "Hazardous Confined Spaces Safety Standard" TB STD 3-7 July 1977.
- Such tests should be conducted by an industrial chemist or a person who, by training and experience, is qualified to perform these tests.
- Any chemical substances which may be hazardous, such as refrigerant gases, PCBs, boiler treatment compounds, boiler scale or sludge, gas stored in cylinders and cleaning and metal treatment compounds must be safely stored or removed.
- Work on the buddy system. Ensure that rescue is close at hand and air breathing apparatus is fully charged and ON HAND.

- d. Do not go into any area that is structurally unsafe or has any unreasonable hazard until it has been corrected.
- e. Make note of large quantities of old coal, grain, sawdust or other material which may be susceptible to spontaneous combustion and arrange for their safe storage or removal.
- f. See that the machinery cannot possibly be started or operated. Ensure a totally dependable lock-out procedure and locking method.
- g. If anything has to be moved to carry out the inspection, see that proper signs, barricades or other methods are in place to keep the visiting public away from the area.

## 2.5 EQUIPMENT

The CPS in most cases provides all necessary tools and equipment for the investigation of machinery. The investigator should become familiar with specialized aids and should identify the need for special staging, heavy lifts or other equipment that may be required.



---

### 3.0 INTRODUCTION SECTION OF INSPECTION REPORT

#### 3.1 EXECUTIVE SUMMARY

The executive summary outlines the contents of the report and summarizes any recommendations. Ideally it should be kept to one page or less.

#### 3.2 TECHNICAL DESCRIPTION

A general technical description of the machine or machinery systems should be established using appropriate terms and units of measurement. It should include such information as name, type of machine, the relation of the machine or mechanical system to all other associated systems or machines including mechanical linkage, electrical, hydraulic or gas systems. All name plate data of the machine or of any separate components should be included.

The inventory should list and describe the machinery on site in a systematic way. One method is to commence with the raw materials handling and end with finished products; alternatively, a factory may be inspected on a room by room basis. In either case, the machinery item list should begin with the larger systems and work toward the smaller auxiliary equipment.

For a textile mill, e.g. the inspection report could proceed by nature of the flow of raw materials from bale openers to brakers, carding, drawing, roving, spinning, winding, prebeaming, beaming, weaving, calendering, dyeing and finishing.

For a hydro-electric generating station, the inspection could logically proceed from dam machinery, head race equipment, pen stocks, turbines, generators, transformers, switches to external transmission equipment.

#### 3.3 HISTORICAL PERSPECTIVE

It is important that a clear historical perspective be established, both as a means of understanding present conditions and as a basis for introducing modifications.

Use both survey evidence and secondary documentary sources to develop the historical perspective. Historic documentation may show the machine while under construction or in operation.

Record major design features. Unique design aspects may establish the historical significance of the machine under consideration.

#### 3.4 PRESENT CONDITION

Following the observations of the general structural design, the surveyor should note the materials and present condition of the machine and its components, including, if possible, the date and sequence of its construction and any signs of past alterations, additions, modifications and extensions which might give a clue to its history. Note relative rates of wear, rust and corrosion. Pay special attention to damage to wood by mechanical fastenings, damage to fastening material because of galvanic action which may have arisen if dissimilar metals were employed close to one another and the effects of differential movement between materials of varying shrinkage rates. In the case of wood, it is important to observe and note damage caused by fungal decay and insects.

The inspection report should include colour photographs, especially of damaged areas. Relate each photo to an existing grid-line system, such as an extant recording grid or to building lines or in the case of a ship, to the appropriate frame number, plank number, deck number and compartment number and indicate the direction, e.g. looking forward to aft, to port or starboard.

#### 3.5 GLOSSARY

If it is necessary to use technical terms that may not be familiar to the average person, a glossary explaining the meaning of these words should be included after the table of contents.

If the terminology is peculiar to the machine or process, the words commonly used to describe it by former operators or in handbooks may be used. In such cases, quote the sources in the glossary.

---

### 4.0 SITE REPORT

A complete investigation of the site and setting comes within the scope of any environmental analysis (see Section 10). When carrying out the survey of the machine, however, basic information should be given on location and physical surroundings.

#### 4.1 LOCATION

The machine site should be identified on a topographical map or site plan. The name of the owner of the machine or plant should be noted, especially if different from the owner of the site.





*Diesel Engine, Bear Creek, YT*

## 4.2 PHYSICAL ENVIRONMENT

Describe the layout of the plant, building or enclosure and other features of interest. Give the general physical characteristics of the machine. Provide climatic data, particularly those factors that may affect the conservation or restoration process.

## 4.3 ACCESS AND UTILITIES

Report the modes of access to the machine and any services required during the survey (electricity, steam, fresh water, garbage removal, pump-out of tanks, etc.).

## 4.4 SECURITY

### 4.4.1 Locks and Guards

Report the forms of security provided. When the machine or site is not watched, access is denied to the general public by a continuous, locked security fence (give its height and construction type) or by a continuous watchman service or other watching or guarding arrangements, such as alarms or dogs.

### 4.4.2 Accessible Hazards

Report any accessible areas which might collapse or any components which might fall on someone. Report also any head or toe traps. Report any unsecured electrical components, flammable stores or any other hazards seen. Report any chemical stores in or around the machine.

### 4.4.3 Fire and Intrusion Alarms

Report all provisions for detecting and fighting fires including alarms, equipment and people available on site and the estimated time of response of the nearest fire detachment. State whether the fire chief feels that the detachment has sufficient resources to fight a fire on the site.

## 5.0 VISUAL MATERIAL AND SAMPLES

### 5.1 MAPS

A map of the general area should be included in the report. If maps from the "National Topographic Series Maps of Canada" are to be used, they should always be ordered by number and name. They should be grouped by scale and listed in increasing numerical order. An example of the NTS numbering system is shown below.

Map Number – 31 G/5

Year of Publication 1975

The Canada Map Office recommends the purchase of maps from the authorized topographical map dealer in your area. Many dealers advertise in the "Yellow Pages" under MAPS. Lists of authorized topographical map dealers for each province may be obtained from the Canada Map Office.

All orders placed through the Canada Map Office must be prepaid. Make cheque or money order payable to Receiver General for Canada. Send together with your order to:

Canada Map Office  
130 Bentley Ave.  
Ottawa, ON  
K1A 0E9

Allow approximately three weeks for delivery.

### 5.2 DRAWINGS AND SKETCHES

Hand-drawn illustrations for this type of report should, if possible, be limited to the size of the format of the report. These should be neatly done so that they will photocopy easily. It is usually better to redraw them in the office, but simple line drawings done in the field can often be used directly.

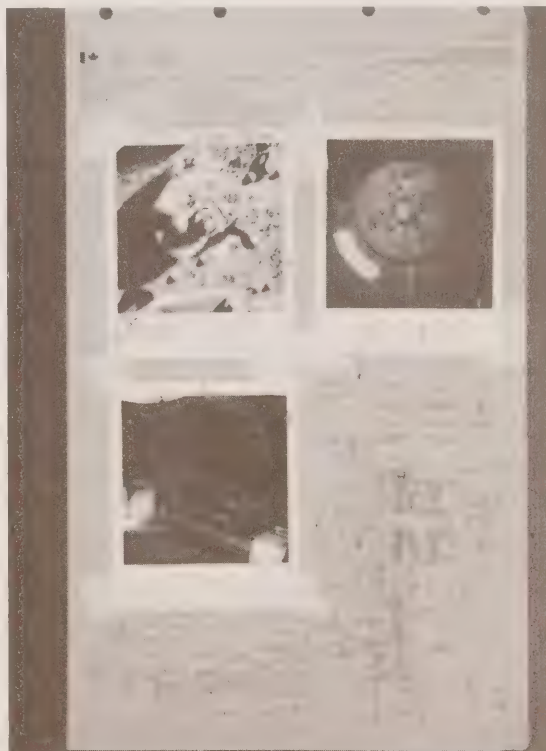
It is preferable to obtain copies of machinery drawings before going into the field. These will be useful for recording on-site observations. For repetitive objects, make multiple copies of the drawings to record problems as needed.

Sketches or drawings in the same format as the report should be placed as close to the first text reference as possible. Drawings, needing more than one fold to make them fit the format of the report, should be placed as an addendum at the end.

### 5.3 PHOTOGRAPHS

Take colour photographs to supplement available photo reports in order to fully describe the site and surroundings and to fully illustrate all points noted in the report. If possible use a simple camera with a flash and a 35 mm wide angle lens in a 35 mm film size. This equipment will do for everything except high structures and small details. For small details such as name plates, small parts, rot and corrosion, it is best to use a special closeup lens, e.g. a 55 mm macro lens, in a 35 mm film size.

For smoke stacks, cranes or other high or difficult to reach structures, use a telephoto lens, e.g. 135 mm, in a 35 mm film size. For a lens over 135 mm, a tripod will help to hold the camera steady.



*Composite Report*

It is best to identify photographs by relating them to building lines, ship's lines or previously established recording lines. It is also helpful to indicate the direction in which it is taken on the

site, e.g. left side from front, north side looking south. The most thorough method is to put the numbers in the picture before taking it; white small numbers and letters on a plaque are usually adequate.

## 5.4 HERITAGE RECORDS

Measured drawings prepared for preservation and archival purposes are sometimes called "as found" drawings, but are more commonly referred to as "heritage record drawings." The Heritage Recording and Technical Data Services Section of the Heritage Conservation Program records significant historic data as a basis for conservation and preservation research, analysis, design, stabilization and maintenance purposes.

Heritage records are special types of documents produced by combining the techniques of traditional hand recording, photography and note taking, with rectified photography and stereo-photogrammetry. These sophisticated techniques can be invaluable to researchers when records of historic machinery are required for restoration design and conservation purposes. The technique requires specialized trained staff. A full discussion of the use of photogrammetry is found in Volume II.

Heritage records also include photo reports and other forms of documentation. Information found on heritage records should be checked during the investigation and all corrections or additions noted for future revision.

## 5.5 SAMPLES

### 5.5.1 *Size of Sample*

Samples should be taken when necessary for material identification. The samples should be the smallest size possible for identification and should be taken from places where their removal will cause the least damage.

A one centimetre square is ample to identify paint colour or wood species. A three centimetre square is better for linoleum, canvas on decks or boiler cladding and lagging (insulation). Samples and sizes of other materials should be left to the project conservator or curator or be taken under their direction. Analysis to determine exact types of metal should NOT be done until restoration design is well underway. Take samples of fuel, grease and oil.

### 5.5.2 *Storage*

All of these samples should be stored safely. One storage method is transparent slide holders. Put one sample in each slide pocket with a card on which is printed the location from which the sample was taken along with the name of the piece of wood, etc. Seal the pocket with a transparent adhesive tape.

Store liquids in small bottles or corked vials or even film canisters. Samples of rot or corrosion products can also be stored in this way. They should all be labeled as stated above, but on the outside of the container.

### 5.5.3 *Rope and Wire*

For rigging samples and electric wire samples not required to be strength tested, take only enough to provide one complete lay or twist of the rope or cable. If the sample has a tendency to unlay, tape it round with a transparent adhesive tape before cutting. If the sample is required for laboratory strength testing, a piece three metres (10'-0") long will be required. Spare pieces from the machine's maintenance stores are suitable only if they have the same age and use history as currently in use. If a piece has to be taken from the machine, arrangements must be made to effect a suitable repair if its absence would create a safety hazard.

## 6.0 RECORDING PROCEDURE

### 6.1 NAME PLATE DATA

First record all the name plate data of the machinery. Start with the main name plate and then do the others in the order in which they are activated within the main machine. Include also part numbers or serial numbers which may appear separately or be cast or stamped into the machine.

Draw a full size sketch of each name plate. State the location of the plate on the machine, locating it with two dimensions. Photograph it as noted in 5.3 above.

### 6.2 LOCATING PLANS AND GENERAL ARRANGEMENTS

Obtain a plan of the plant in which the machine is located. Draw a schematic plan if measured drawings are not available.



Ensure the correct location and dimensions on the measured drawings of the base plates of the machinery, the centre lines of all main shafts and the center lines of pipes at the point where they enter the machine. Check the exact size of pipes by the measured outside diameter, using calipers. Describe all types of pipe or hose and fittings, including colour, material and insulation and the fitting system e.g. flanged, screwed, welded, etc. For this type of report, it is not necessary to give other dimensions unless they relate to some specific restoration problem.

### 6.3 DISASSEMBLING

Do not disassemble anything without permission from the project manager. It is also wise to have detailed written instructions from the designer in charge of the restoration. Ensure the following information is included on the measured drawings:

- torque wrench readings of fastenings
- the exact setting of adjustable parts, screw stops, gauges, etc.
- witness marks
- precise shaft deflections
- poker gauge readings
- thickness of shims
- thickness of gaskets
- wear patterns related throughout the machine, etc.

Procedures for carrying out these specialized recordings must be delineated by the architectural or engineering designers in charge, otherwise valuable information bearing on the restoration design and operational history may be lost.

### 6.4 DAMAGED OR MISSING PARTS

Note all places where parts appear to be missing. Ensure that photographic records are obtained.

Estimate pipe diameters, lengths of missing pipe and number of turns required. Note the same information for any missing wire, cable, chain, belts, shafts, etc.

Note any missing insulation, fastenings or machine guards.

### 6.5 ELECTRICAL SYSTEMS

If operational, the electrical system should be surveyed by the electrical designer. To facilitate the electrical designer's work and planning, photograph all electrical panels or boards (state

which are live), one of each kind of electrical fittings used and all electric motors, generators, heaters, etc. Obtain an overall shot of the site showing the utility lines.

Describe the type of wire and its supports or conduit. Describe any gauges or signalling systems. Identify the location of the closest utility lines to the site.

### 6.6 MECHANICAL LINKAGE SYSTEMS

This shall include systems delivering power or signals over a distance, using cables, chains, sliding or twining shafts, etc., when the units involved are out of sight of each other.

In the case of chain, give the total length of chain and the length of any missing sections. Note its general condition. When preparing a detailed analysis, give the link sizes by measuring the links as follows:

To find the dimension of links in chain, gauge a definite number of links, at least nine, with a caliper rule, deduct twice the material diameter and obtain the inside length, "L," of number of links taken. Divide this "L" dimension by the number of links measured. The resulting figure is the average inside length of one link or pitch. "W" or width, of link can be obtained by using simple calipers. By adding twice the diameter of stock to inside width thus obtained, outside width can be determined.

Note any missing gypsies, sprockets, sleeves or gears.

In the case of sliding shafts, note the condition of the shaft, the fittings where the shaft terminates, the size of the shaft and the distance between guides. Note any loose or missing fastenings. In the case of turning shafts, note the condition of the shaft, any associated fittings, the size of the shaft and the distance between bearings. Note any loose or missing fastenings.

Name the type and size of linkages used, the number and type of guides, blocks, fittings, etc.

Locate, by dimensions, the beginning and ending of the system.

Give the estimated length of any missing pieces and the number and type of any missing fittings, if possible. Photograph the whole system. Report any system under load, such as vertical conveyors or a derrick supported by its cables. State what breaking or nipping arrangements have been made or whether there may be a safety hazard.

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## 7.0 SPECIAL SURVEYING TECHNIQUES

### 7.1 DEFLECTION NOTATION

Check all foundations, footings or bed plates for level and bending. Use a carpenter's level or surveyor's equipment to measure and calculate the amount of any deflection to the nearest minute of arc. Check the machine framework and bearing supports for bending, movement or misalignment. Check for sag in rollers, shafts and levers.

In the case of shafts and parts bolted to the walls or ceilings of a building, check the building for movement or sag.

Note any worn gears, bearings or slides.

Check all parts for freedom of movement and note any parts that will not move.

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## 8.0 RECOMMENDATIONS

### 8.1 JURISDICTIONAL REQUIREMENTS

The report will be useful as far as it is authoritative. To ensure this, the following practices should be included:

- a. Cover all points, preferably in the order in which they appear in this manual.
- b. State exactly what you see. Do not make any judgments concerning the strength of any member unless you are authorized to do so and are able to show relevant figures or calculations.
- c. Do not comment on the feasibility of restoration or conservation on the machinery or any portion of it unless appropriate input can be obtained from the persons who will be responsible for the restoration or conservation design.
- d. Do not comment on the names or uses of parts of the machinery. If people who appear qualified volunteer information, note their names, address, phone number and list them in an appendix at the end of the report as "local resource people."
- e. Do not recommend site services, as this will require agreement by all the designers and users involved.
- f. If the decision to restore or conserve the machine has been made, recommend in conjunction with the designers:

- heritage recording
- fire and safety improvements as required
- interim stabilization as noted in 8.3 below.

### 8.2 TESTING AND STANDARDS

#### 8.2.1 *Testing*

If the structural strength of any particular member or component is suspect, recommend an engineering investigation.

Do not recommend any specific type of structural testing without consultation, preferably in writing, from the designated restoration designer or structural engineer. Testing to identify materials should be carried out and included in the report if possible. Strength testing for rope, chain or wire should be done if possible and included in the report. Samples should be taken as described in 5.5 above.

#### 8.2.2 *Operational Standards*

Many authorities regulate or set standards for machinery and their various components. Any relevant standards pertaining to the machine should be included in a bibliography at the end of the report.

A separate list of standards should be made for standards that affect the machinery as it is now or as it might be when viewed by the general public.

### 8.3 INTERIM STABILIZATION

#### 8.3.1 *Metal Elements*

The primary cause of damage to machinery is usually corrosion. To avoid corrosion, all ferrous metal must be kept free of moisture, particularly when acids, salts or dissimilar metals may be present. Sources of moisture may be rainwater, wash water or condensation.

To inhibit rust, the metal may be coated with a good grade of metal paint. A better way is to thoroughly coat the metal with WDRI (water displacing rust inhibitor). The best way is to keep the metal in a waterproof, heated building. Keep dissimilar metals from touching each other by coatings or other means. This will avoid galvanic reaction which can promote corrosion at a rapid rate.



There are a number of forms of corrosion including the following:

- a. Uniform attack:  
The metal corrodes evenly where exposed to corrosive agents.
- b. Pitting:  
The corrosive attack is localized on the metal.
- c. Selective attack:  
The metals or their coatings were never actually homogeneous and certain areas are attacked.
- d. Cracking:  
Cyclic stresses set up in the metal cause corrosion fatigue which in turn results in corrosion cracking which opens up the protective oxide coating and exposes fresh metal to be acted on by the corrosive agents.
- e. Erosion:  
The corrosion resistant film of oxide or layers of protective corrosion product is removed by abrasion, exposing fresh metal to the corrosive agents for attack.
- f. Galvanic corrosion:  
Two dissimilar metals usually differ in electrode potential. If they are immersed in the same electrolyte, electrons will flow from the less noble or more active metal through the solution to the more noble or less active metal. In some cases the electrolyte may be moisture or condensation on the surfaces of the metals.
- g. Concentration cell:  
An electrolytic cell is set up by the trapping of oxygen adjacent to the metals.
- h. High temperature corrosion:  
A kind of dry oxidation occurs at very high temperatures leaving corrosion products on the surface. If the film of these corrosion products is porous, the corrosion can continue unabated. If it is non-porous, the film can be highly protective.

The rate of corrosion is affected by primary and secondary factors. Primary factors include the following:

- a. electrode potential of dissimilar metals in an electrolytic situation;
- b. hydrogen overvoltage;
- c. physical nature of the metal surface; and
- d. ability of the metal surface to form a protective film.

Secondary factors include the following:

- a. hydrogen-ion activity;
- b. influence of oxygen in solution adjacent to the metal (oxygen concentration cell);

- c. other ions present in solution;
- d. rate of moisture flow;
- e. temperature;
- f. static stresses present in the metal;
- g. cyclic stresses present (corrosion fatigue); and
- h. effects of dissimilar metals.

The suggested temporary methods for alleviating rust corrosion apply to other forms of corrosion as well.



*Rust Corrosion on Machine*

A permanent cure may require a proper in-depth investigation and recommendations by a machine restoration engineer or an industrial chemist.

### 8.3.2 Wood Elements

The primary cause of damage to wooden parts is by fungal attack or rot. To inhibit or stop the rot, the moisture content of the wood should be brought down to about ten percent to 12 percent. The best way to do this is to keep the rain or snow off and let as much air in as possible.

If rot or fungal attack is apparent, take photographs and have samples analyzed to find the specific variety. The restoration designer should then recommend any fungicide to be used. The fungicide must be compatible with all stabilization compounds specified in the restoration design.

*Illustrations are the property of the  
Heritage Conservation Program, unless otherwise noted*



# **VOLUME III HISTORIC SITE ANALYSIS**

## **7.2 INVESTIGATION AND ANALYSIS OF MARINE AND INDUSTRIAL SITES PERIOD VESSELS**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
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ORIGINAL DRAFT: R. FAIRWEATHER

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## 1.0 INTRODUCTION

This article is written for technical and professional personnel trained in the inspection of vessels. It is intended to provide specialized information concerning the inspection of historic vessels no longer in service. It covers safety issues of particular concern for an inspector of such vessels, but it does not provide detailed information about the inspection itself. The article, however, does provide information on the preferred format and areas of coverage for a historic vessel inspection report.

Ships and boats usually deteriorate quickly once they go out of service. They are such specialized structures that they have more maintenance problems than other types of structures. The trades needed to build and maintain wooden vessels are dying out.



*RCMP St. Roch*

It is the policy of the Canadian Parks Service (CPS) and of most museums not to operate historic vessels because this may cause severe wear, leading to expensive maintenance and conservation problems or to the loss of the vessel.

However, should it be decided to return a historic vessel to active service, both Ships Safety, Canadian Coast Guard (SSCCG) and the Classification Society must be consulted in order to bring the vessel up to present-day standards for safe sea sailing in weather and conditions suited to the vessel's age, size and type. This is particularly true if a change in service conditions from the original are envisaged.

Every effort must then be made to ensure that requirements for this investigation do not conflict with SSCCG and Classification Society's minimum standards for vessels that come under their jurisdiction. This publication does not replace these agencies' rules and regulations. Rather, this publication describes the considerations and requirements for preparing appraisals of historic vessels.

The investigation and recording of ships and boats is highly specialized, requiring different inspection, notation and drafting techniques than for land-based structures. If these investigations are not carried out properly, the restoration will be difficult and more costly or an additional investigation will have to be made.

This publication is intended for people who are involved in or who have jurisdiction over, the restoration and maintenance of historic vessels. It covers the technical considerations involved in investigating vessels for restoration or conservation and for historic research purposes.

This guide is organized beginning with the most essential data first and subsequently dealing with more detailed information until a comprehensive report is attained.

## 2.0 ORGANIZING THE INVESTIGATION

### 2.1 TERMS OF REFERENCE

The inspector responsible for preparing the inspection should review the terms of reference with the project manager and, if necessary, revise them. The terms of reference define and describe the exact nature of the job to be done, the limitations of the survey and the format for reporting the findings. It also provides work schedule deadline dates. Other information to be reviewed includes basic project objectives and functional restrictions of the vessel.

### 2.2 BACKGROUND DOCUMENTATION AND INFORMATION

The inspector should gather documentation relevant to the investigation of the vessel. This information is normally assembled in collaboration with the other specialists on the project team. It should include all historical and contemporary records which will contribute to an understanding of the vessel's evolution, recent maintenance and present status.



This information may be gleaned from several sources, including historic trade literature, industrial and shop manuals, site investigations, etc., and may entail the preparation of specialized records.

Some documents that might be included are: Certificate of Registration from Ministry of Transport (MOT), any original design or alteration specifications, design applications to MOT hull, boiler or engine inspection reports, Master's Oath on Entry, Customs Clearance Canada, any operating or maintenance manuals or pamphlets, ship's log, engine room log, etc.

### 2.3 PRELIMINARIES

When an investigation is considered extensive or complex, the surveyor should make a preliminary visit to become reasonably familiar with the class of vessel. He or she should take note of any items which would require the assistance of technical specialists (e.g. freeing spaces of gas, exterior hull inspection or underwater examination of shafting, brackets, propeller, rudder, suction and discharges). It is also important at the outset to identify the need for cleaning of spaces, dry docking, staging, tugs, services, access and removal of the vessel's stores, furnishings and materials. If a completed record is not yet available for the vessel, the appropriate Assets Inventory System (AIS) form should be filled out by the surveyor.

### 2.4 SAFETY

#### 2.4.1 *Before Going Aboard Any Vessel*

Before going aboard any vessel ensure that the following conditions are met:

- a. Permission to come aboard has been given by the person with direct responsibility for the site or the vessel.
- b. Wear a hard hat and protective clothing as necessary.
- c. Ensure that:
  - All compartments are free of any dangerous fumes due to fuels, chemical storage, fungicides or engine exhaust. A sealed compartment is checked for oxygen deficiency, possibly arising from combustion or rusting.

- Any tank space to be entered is emptied, steam cleaned, gas freed and filled with good air before entering.
- Any questionable compartment or tank space is tested for oxygen deficiency and harmful vapours before entering. See Treasury Board's "Hazardous Confined Spaces Safety Standard" TB STD 3-7 July 1977.
- The tests are conducted by an industrial chemist or a person who, by training and experience, is qualified to perform these tests.
- Work is done on the buddy system.
- Rescue is close at hand and air breathing apparatus is fully charged and ON HAND.

- d. Do not climb the rigging if it looks unkempt, frayed or in any way suspect or if you do not have the proper safety harness, safety line, correct shoes, etc. Do not climb the rigging if you are not experienced or able. Recommend that a professional rigger be hired to do that part of the investigation or contact Machines and Vessels Section of Heritage Conservation Program, Ottawa.

#### 2.4.2 *Before Going Aboard Any Vessel Hauled Out*

Before going aboard any vessel that is hauled out, ensure that the following conditions are met:

- a. the vessel is well blocked up so that it will not move;
- b. shores are tied off; and
- c. access ladders or gangways are off or otherwise secured.

#### 2.4.3 *Before Going Aboard Any Vessel Afloat*

Before going aboard any vessel that is afloat, partially aground or moored offshore, ensure that the following conditions are met:

- a. any boat used to make external inspection and come alongside is safe and suitable;
- b. a safe access ladder is provided; and
- c. wear a "personal flotation device" or MOT approved life preserver.

### 3.0 INTRODUCTION SECTION OF INSPECTION REPORT

#### 3.1 EXECUTIVE SUMMARY

The executive summary outlines the contents of the report and summarizes any recommendations. It should be kept to one page or less.

#### 3.2 TECHNICAL DESCRIPTION

A general technical description of the vessel should be established using appropriate terms and standard (SI) units of measurement. One useful source of terminology is the DIAND Report EA HQ 79-72, Glossary, Sailing, Rigging and Ship-building Terms, copies of which are available through:

Heritage Conservation Program,  
Architectural and Engineering Services,  
Public Works Canada for Environment Canada.

The technical description should include such information as name, type of vessel, materials, type of construction, layout, number of cargo holds, superstructure, machinery spaces, type of power with description of engine drive and propellers, place built, year built, classification and characteristics (length, depth, beam, draft, freeboard, gross tonnage, net tonnage, deadweight, displacement, framing systems, type of bulkheads, fuel capacity of the vessel and relative age of the different fixtures in the vessel).

The machinery located in each of the machinery spaces should be listed, commencing with the main engine and boilers and continuing through the power plant auxiliaries to the minor items on board. The major characteristics of each component should be detailed, including name plate data. The inventory should include the date and place of manufacture where known.

The appropriate AIS form can be used as a guide when preparing a technical description.

#### 3.3 HISTORICAL PERSPECTIVE

It is important that a clear historical perspective be established, both as a means of understanding present conditions and as a basis for introducing modifications.

Use both survey evidence and secondary documentary sources in developing the historical perspective. Historic documenta-

tion may show the vessel while under construction or in operation. During the survey, note information on plaques and hull-builder's shield, as well as any change in the internal arrangements, hull, superstructure and machinery locations.

Record major design features. Unique design aspects may establish the historical significance of the vessel under consideration.

#### 3.4 PRESENT CONDITION

Following the observations of the general structural design, the surveyor should note the materials and present condition of the vessel and its components. Record the date and sequence of its construction, including any signs of past alterations, additions, modifications and extensions which might give a clue to its history. Note relative rates of decay, with special attention to damage to wood by mechanical fastenings; damage to fastening material, because of galvanic action which may have arisen if dissimilar metals were employed close to one another; and the effects of differential movement between materials of varying shrinkage.

In the case of wood, it is important to observe and note damage caused by fungal decay and insects.

In the case of machinery, note the relative rates of corrosion, in particular where active pitting is in evidence or where running surfaces are under attack due to chemical or galvanic action. Note also any chemical substances still on board in machinery spaces and make recommendations for their safe storage or removal.

The inspection report should include colour photographs, especially of damaged areas. Relate each photo to the appropriate frame number, plank number, deck number and compartment number and indicate the direction, e.g. looking forward or aft, to port or starboard.

#### 3.5 GLOSSARY

The report should be concisely written. If it is necessary to use technical terms that may not be familiar to the average person, a glossary explaining the meaning of these words should be included after the table of contents. Use definitions from dictionaries or text books if possible. Such publications might include: *The Mariner's Dictionary* by Gershom Bradford, Weathervane Books, NY.; the *RSD Glossary of Marine Terms* by Machines and Vessels Section, R.S.D., Parks Canada, Ottawa; *Manuals of Seamanship* Vols. 1, 2 and 3 by Their Lordships of the Admiralty, Her Majesty's Stationery Office, London.



*"As found" Vessel*

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## 4.0 SITE REPORT

A complete investigation of the site and setting comes within the scope of an environmental analysis (see Section 9). When carrying out the survey of the vessel, however, basic information should be given on location and physical surroundings.

### 4.1 LOCATION

The vessel should be identified on a topographical map or site plan. The body of water on which the vessel rests should be given, if applicable and accurately recorded together with the city, province and the name of the owner of the vessel.

### 4.2 PHYSICAL ENVIRONMENT

Describe the layout of the berth and other features of interest. Give the general physical characteristics of the vessel. Provide climatic data, particularly those factors that may affect the conservation or restoration process.

### 4.3 ACCESS AND UTILITIES

Report the modes of access to the vessel and any services required during the survey (electricity, steam, fresh water, garbage removal, pump-out of tanks, bilges, etc.).

### 4.4 SECURITY

#### a. Locks and Guards:

Report the form of security provided. When the vessel is not watched, access is denied to the general public by continuous, locked, security fence (give its height and construction type) or by a continuous watchman service or other watching or guarding arrangements, such as alarms and dogs.

#### b. Accessible Hazards:

Report any accessible areas which might collapse or any components which might fall on someone. Report also any head or toe traps. Report any unsecured electrical components, flammable stores or any other hazards seen. Report any chemical stores on board.



c. Fire and Intrusion Alarms:

Report all provisions for detecting and fighting fires including alarms, equipment and people available on site and the estimated time of response of the nearest fire detachment. State whether the fire chief feels that there are sufficient resources to fight a fire on the site.

## 5.0 VISUAL MATERIAL AND SAMPLES

### 5.1 MAPS AND HYDROGRAPHIC CHARTS

A map or chart of the general area should be included of the same size as the format of the report, if possible.

If maps from the "National Topographic Series Maps of Canada" are used, they should always be ordered by number and name. They should be grouped by scale and listed in increasing numerical order. An example of the NTS numbering system is shown below.

Map Number – 31 G/5  
Year of Publication 1975

The Canada Map Office recommends the purchase of your map requirements from the authorized topographical map dealer in your area. Many dealers advertise in the "Yellow Pages" under MAPS. Lists of authorized topographical map dealers for each province may be obtained from the Canada Map Office.

All orders placed through the Canada Map Office must be prepaid. Make cheque or money order payable to "Receiver General for Canada." Send together with your order to:

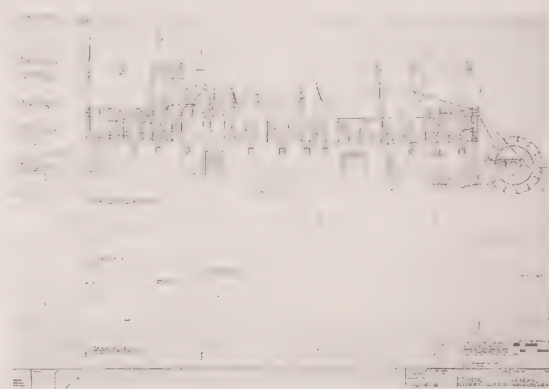
Canada Map Office  
130 Bentley Ave.  
Ottawa, ON  
K1A 0E9

Allow approximately three weeks for delivery.

Hydrographic charts may also be ordered from the above source. Quote the chart number when ordering. Large scale harbour charts are usually the best for this purpose if they are available. Maps or charts are essential if any relocation of the vessel is to be considered.

### 5.2 DRAWINGS AND SKETCHES

Hand-drawn illustrations for this type of report should, if possible, be limited to the size of the format of the report. These should be neatly done so that they will photocopy easily. It is usually better to redraw them in the office, but simple line drawings done in the field with a fine felt pen can often be used directly.



*Orthographic View, S.S. Keno*

It is preferable to obtain copies of ship drawings before going into the field. These will be useful for recording on-site observations. A technique useful for repetitive objects, such as portholes is to make multiple copies of the drawings to record problems as required.

Sketches or drawings of the same format as the report should be placed as close to the first text reference as possible. Drawings needing more than one fold to make them fit the format of the report should be placed as an addendum.

### 5.3 PHOTOGRAPHS

Take enough colour photographs to fully describe the site and surroundings and to fully illustrate all points noted in the report. If possible use a simple camera with a flash and a 35 mm wide angle lens, in a 35 mm film size. This equipment will do for everything except rigging and rot. For rot, use a close-up special lens, e.g. a 55 mm macro lens, in a 35 mm film size.

For rigging and smoke stacks, use a telephoto lens, e.g. 135 mm, in a 35 mm film size. If the lens is over 135 mm, a tripod is necessary to hold the camera steady, however it cannot be used from a boat.

It is best to identify photographs by beam or frame numbers and the direction in which it is taken on the ship, e.g. to bow, to stern, to starboard, to port. The best method is to put the numbers in the picture before taking it. Numbers and letters 20 mm high on a small plaque are usually adequate.

#### 5.4 HERITAGE RECORDS

Measured drawings prepared for preservation and archival purposes are sometimes called "as found drawings," but are more commonly referred to as "heritage record drawings." The Heritage Recording and Technical Data Services' Section ensures that significant historic data is systematically recorded as a basis for conservation or preservation research, analysis, design, stabilization and maintenance purposes.

Heritage records are special types of documents produced by combining the techniques of traditional hand recording, photography and note taking, with rectified photography and stereo-photogrammetry. These sophisticated techniques can be invaluable to researchers when records are required of historic vessels for restoration design and conservation purposes. The work requires specialized trained staff. A full discussion of the use of photogrammetric drawings is found in Volume II.

#### 5.5 SAMPLES

##### 5.5.1 *Size of Sample*

Samples should be taken when necessary for material identification. The samples should be the smallest size possible for identification and should be taken from places where their removal does the least damage.

A one centimetre square is ample to identify paint colour or wood species. A three centimetre square is better for linoleum, canvas on decks or boiler lagging (insulation) and cladding. All other fabrics should be left to the project conservator or curator or be taken under their direction.

##### 5.5.2 *Core Samples*

For heavy wooden timbers that may be rotten in the middle, core samples may be taken. Take the sample from a place where it will not show and if possible, the resulting holes should be closed with a removable cork. Use a small diameter thin wall core sampler with saw teeth. The thick auger type should not be used in restoration or conservation. Core samples should be stored by

injecting them into a tube in the order in which the sample is being taken. The tube ends are then plugged and the tube labelled. The label should identify exactly which piece of wood the core sample has been taken from and the sample must then be analyzed in a lab to determine which type of fungal attack is taking place.

##### 5.5.3 *Storage*

Samples should be stored safely. One method is a three-ring binder with plastic, transparent slide holders. Put one sample in each slide pocket with a paper or card on which is printed the exact location from which the sample was taken, along with the name of the piece of wood. Seal the pocket with a transparent adhesive tape. Empty film canisters also work well.



*Exterior Hull, S.S. Klondike, Whitehorse, YT*

##### 5.5.4 *Rope and Wire*

For rigging samples and electric wire samples not required to be strength tested, take only enough to provide one complete lay or twist of the rope or cable. If the sample has a tendency to unlay, tape it round with a transparent adhesive tape before cutting. If the



sample is required for laboratory strength testing, a piece three metres (10'-0") long will be required. Spare pieces from the ship's stores are suitable if they have the same age and use history as that cordage currently in use. If a piece has to be taken from the rigging, arrangements must be made to effect a suitable repair.

## 6.0 RECORDING PROCEDURE

### 6.1 EXTERIOR HULL

#### 6.1.1 *Exterior Hull, Vessel Afloat*

If the vessel is afloat, inspect the outside of the hull from a boat. Start from the bow and systematically work round the vessel. All notes and comments should indicate locations by number of strakes down from the sheer strake ("0") and the number of frames aft from the stem.

#### 6.1.2 *Exterior Hull, Wooden Vessels*

Note plank damage, such as rot, gouging, burning or splitting. Check particularly where the planking enters a stem rabbit, butts on a transom or butt block or passes under steel fittings.

Note any unfair bulge or depression in planking, indicating broken fastenings or broken frames.

In the case of lap strake planking, pay particular attention to splits along the rivet heads, missing rivets or severe chafing along the rivet edge of a plank.

Note any sheared fastening heads or damaged through-the-hull fittings and scuttles. Check whether any fastenings are missing or if part or all of the outside flange is missing.

Note any cracked or otherwise damaged chain plates.

Note any unfair curves in planking seams indicating major structural damage. If planks are secured with steel strapping, it may mean that the entire hull must be refastened.

#### 6.1.3 *Exterior Hull, Steel Vessels*

Note excessive corrosion areas, denting, bends and buckles, cracked welds or cracked plates along the weld in welded vessels and cracks adjacent to the rivets or riveted seams in riveted vessels.

Note any sheared fastening heads, damaged through-the-hull fittings and scuttles. Check whether any of their fastenings or parts are missing.

### 6.2 RIGGING

Inspect the rigging using a good glass or binoculars (eight power, if hand held).

If you have to climb the rigging use a safety belt and safety line. If the rat lines or lashings look rotten, hire a professional rigger to make the rigging report.

Check first the running rigging starting with load-carrying halyards, such as spar halyards. Note the strength and condition of fastening arrangements holding any block or cleat down to the deck. Strops on halyards of natural fiber tend to rot at the lowest point where rain-water collects or where they are covered, such as passing through a peak sheave. If in doubt about the condition of the support, have the spar lowered to the deck. Do not attempt to lower it yourself; get help from the people having jurisdiction over the vessel. Before loosening the halyard, put a safety halyard on the spar. Keep people out from under it. If the halyard is rotten, it may let go as soon as it is moved on a block. Blocks, pins and swivels may be rusted through in areas not visible to the investigator.

Get a sample of each type of non-metallic rope used in the rigging, if it is possible to do this without weakening any systems. Have the rope tested for tensile strength in a lab. For steel cable, inspect a length very carefully and count the number of broken strands in three metre (10'-0") lengths. Count the number of strands and the number of wires per strand. Measure the diameter. Contact the manufacturer to determine the loss of strength in the cable. Check all blocks for damage and missing parts.

Check all spars for rot, checking for other damage.

### 6.3 EXTERIOR ELECTRICAL

List all the electrical fittings by name, location and the number and type of wires that run to them. Note any places where fittings appear to be missing. Photograph all fittings and all places where fittings appear to be missing.

The restoration electrical designer will have to do all or part of the electrical investigation and so should be consulted before starting.

## 6.4 DECKS, EXTERIOR

### 6.4.1 *Decks, Exterior, General*

Start from the bow of the upper deck and systematically work aft. All notes and comments should indicate locations by the frame number of the nearest beam and a dimension from the centre line to port or starboard. Photograph each item referenced and take general photographs of the whole area. Take a sample of the paint or varnish used. If the deck is made of or covered with, a perishable material such as wood or canvas, take a sample if possible.

### 6.4.2 *Deck Machinery and Anchors*

Note any special hazards, such as anchors hung outboard and their securing arrangements. Check every rope cable or chain bearing load, note any fuel left in any container, including operational engines on deck and check live electrical equipment and arrangements for insulating it from rainwater or tampering.

Note the location of each machine by frame number and give a dimension to the ship's centre line. Record all deck machinery according to Section 7.1 "Period Machinery."

### 6.4.3 *Deck Fittings, Funnels and Vents*

Locate and note whether rainwater can penetrate through the fittings and vents to the tank spaces and compartments below.

Note any vents or funnels that are causing the deck to deflect or are unstayed and possibly unstable when subjected to a load by wind, snow or the visiting public.

Use all applicable recording techniques mentioned in Section 7.1 "Period Machinery."

Note any twisting or leaning of funnels or vents and record as noted in paragraph 7.1.

### 6.4.4 *Decks, Exterior, Wood*

Note the type and extent of damage such as rotten, split, gouged or burned members.

Note whether the damage occurs in conjunction with any special load, such as winches, davits, loose fittings, etc.

Note whether the damage occurs in conjunction with any items that pass through the deck, such as through-deck fittings, masts, stanchions, hawse pipes, bollards or bulwark frames.

Note whether the damage occurs in conjunction with any architectural features, such as butt blocks, break decks, deck houses, hatches or fixed deck lockers.

### 6.4.5 *Decks, Exterior, Steel*

Note the type and extent of damage, such as corrosion areas, denting, bends and buckles, cracked welds or cracked plates along the weld in welded vessels and cracks adjacent to the rivets or riveted seams in riveted vessels. Note any sheared fastening heads, damaged through-the-deck fittings or any damage to fitting base plates. Note whether the damage is in conjunction with other elements, as suggested in the preceding paragraph for wooden vessels.



RCMP St. Roch

## 6.5 DECK HOUSES

### 6.5.1 *Deck Houses, Exterior, General*

Starting from the bow, locate each wall of the deck houses and state their lengths and height.

Locate the deck houses to the nearest beam or frame by number and by a dimension from the ship's centre line to port or starboard. Use a similar method to locate areas referenced in notes and photograph them. Note and photograph any damage to the roof or weather deck of the deck house, especially damage which may admit water or cause a safety hazard. Note any mechanical item on this weather deck. Note and photograph any damage to the bulkheads, especially damage that may admit moisture, birds or rodents or cause a security problem. Note any mechanical item on these bulkheads.

Take paint samples of each type of paint or coating.

Note any deflections, leans or cracking in the structure and record them. Recommend tests if necessary.

### 6.5.2 *Deck Houses, Exterior, Wood*

Note any fungal deterioration and take samples and close-up photographs.

Note the type of planking used and any covering employed. If necessary, include a sketch.

### 6.5.3 *Deck Houses, Exterior, Steel*

Note the type and extent of damage, such as corrosion areas, denting, bends and buckles, cracked welds or cracked plates along the weld in welded vessels and cracks adjacent to the rivets in riveted vessels. Note any sheared fastening heads, damaged through-the-deck fittings or any damage to fitting base plates. Note whether the damage is in conjunction with other elements. Check for corrosion.

Take photographs and samples and make sketches as required.

## 6.6 COMPARTMENTS

### 6.6.1 *Compartments, General*

This includes compartments in deck houses. Start from the bow and systematically work aft. All notes concerning the deck or deck head should reference the frame number of the nearest beam and provide a dimension from the ship's centre line to port or starboard.

Notes concerning transverse bulkhead should reference the frame number of the bulkhead, a dimension port or starboard from the centre line and a dimension to the nearest decks.

Notes concerning side or longitudinal bulkheads points should reference the number of the nearest frame and a dimension to the nearest deck.

Note all damaged or deficient heating or ventilating systems.

Record all machinery according to Section 7.1 "Period Machinery."

### 6.6.2 *Compartments, Wood*

Note any rot in the stem or breast hook knees. If the vessel has a ceiling skin over the frames, probe for rot in the frames through the airway. Note the size of the airways. If there is no airway, arrange to have the top strake of the ceiling removed. This should be left off to provide ventilation. Note any damage to built-in furniture. Check for rot by removing drawers or springs and mattresses. Check under loose floor coverings.

### 6.6.3 *Compartments, Steel*

Note the type and extent of damage, such as corrosion areas, denting, bends and buckles, cracked welds or cracked plates along the weld in welded vessels and cracks adjacent to the rivets or riveted seams in riveted vessels. Note any sheared fastening heads, damaged through-the-deck fittings or any damage to fitting base plates. Note whether the damage is in conjunction with other elements. Check for corrosion.

Take photographs and samples and make sketches as required.



## 6.7 BOTTOM AND BILGES

### 6.7.1 *Bottom and Bilges, General*

Start from the bow and systematically work aft. Notes concerning these areas should reference the frame number of the nearest beam and a dimension from the centre line to port or starboard.

### 6.7.2 *Bottom and Bilges, Wood*

Note any rot in heavy timbers, such as stem gripe breast hooks, knees, floors, keelson, hog keel, etc. Check particularly areas that have the least amount of ventilation and the largest wooden members. Check all engine stringers and machinery mounting pads.

Check particularly the structural soundness and suitability of members supporting masts, machinery or other concentrated loads.

Pay particular attention to areas that form water or moisture pockets, especially around keel, keelson and stern post. Make note of a space too constricted to inspect or concealed from inspection. State what would be necessary to inspect it.

Before entering any space that has been sealed, observe all proper safety requirements.

### 6.7.3 *Bottom and Bilges, Steel*

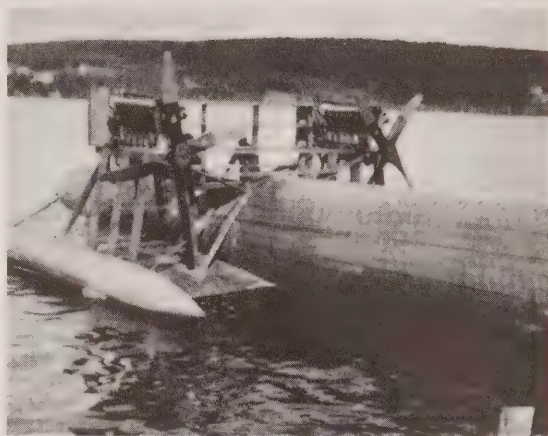
Note the type and extent of damage, such as corrosion areas, denting, bends and buckles, cracked welds, cracked plates along the weld in welded vessels and cracks adjacent to the rivets in riveted vessels. Note any sheared fastening loads, damaged through the deck fittings or any damage to fitting boss plates. Note whether the damage is in conjunction with other elements.

If a space is constricted or is otherwise concealed from inspection, state what steps would be necessary to gain access to it.

Before entering any space that has been sealed, observe all proper safety requirements as set out in 2.4 above.

## 6.8 MACHINERY AND MACHINERY SPACES

Inspect the compartment and note any damage or deficiencies. Locate machinery base plates and all centrelines noted to the nearest frame and by a dimension to the ship's centre line and relevant deck elevation or water line. Inspect and record all machinery according to Section 7.1 "Period Machinery."



HD-4  
Alexander Graham Bell Museum, Baddeck, NS

## 6.9 SYSTEMS

### 6.9.1 *Piping Systems*

Note which machines, tanks, etc., that the pipes run between.

Describe the machines by name plate data. Do not name them or state their use unless authorized. Describe tanks by their dimensions and, for vents, give their size and pipe type.

Give the exact size of all pipes by measuring the outside diameter (OD), using calipers. Describe the type of pipes, hoses and fittings, including colour, material and insulation and the fitting system, e.g. flanged, screwed, welded, etc. Give the lengths of all missing pieces and locate, by dimensions, the starting and ending point of the pipe.

For the purpose of this type of report, it is not necessary to give other dimensions unless they relate to some specific restoration problem.

### 6.9.2 *Electrical Systems*

The electrical system must be surveyed by the electrical designer. To facilitate his or her work and planning, photograph all electrical panels or boards (state which are live), one of each kind of electrical fitting used and all electric motors, generators, stoves, heaters, etc. If possible take an overall shot of the site showing the utility lines.

Describe the type of wire and its supports and conduit. Describe any paging or signalling systems. State where the closest utility lines are to the site.

### 6.9.3 Mechanical Linkage Systems

This includes systems delivering power or signals over a distance using cables, chains, sliding or twining shafts, etc., when the units involved are out of sight of each other.

Name the type and size of linkages used, the number and type of guides, blocks, fittings, etc.

Locate, by dimensions and frame notes, the beginning and ending of the system.

Give the length of any missing pieces and the number and type of any missing fittings. Photograph the whole system. Report any systems under load, such as anchors held outboard or a derrick supported by its cables. State what breaking or nipping arrangements have been made or whether there may be a safety hazard.

## 7.0 SPECIAL SURVEYING TECHNIQUES

One of the most important ways of determining structural damage on a ship is to note all the parts that have moved out of their original designed position and to compare the relationship of these movements to the structure as a whole. All of these deflections should be measured and the results carefully placed on drawings of sections through the ship. This is necessary to facilitate engineering studies of the structure.

### 7.1 DEFLECTION NOTATION

#### a. Structural Uniqueness:

A ship may be trimmed or hauled out at any angle or may have deformations of the hull. It is therefore usually impractical to use a fixed horizontal or vertical plane as a reference bench mark. Consequently all angle measurements taken must be referred to each other and to the original projected design assumptions. These may include the assumption that all curving structural members maintain the correct fair curve unless modified by special design considerations.

Most structural features on opposite sides of the ship are at similar water line elevations and similar dimensions off the lubber's line, except in areas with specialized use requirements.

Most pillars, transverse bulkheads, masts, funnels, etc., are aligned athwartships parallel to the midship's vertical centre line. They may be aligned vertically fore and aft or follow the rule of rake for that vessel.

These structural features can be used as references for deflection measurements.

#### b. Measuring the Angles:

To carry out this type of notation, make a simple sketch section showing all the main structural members. Measure the angle that each is from the vertical or horizontal by using a 610 mm (2'-0") carpenter's level. Measure the distance off level in 100ths of a foot or in millimetres and find the angle using trigonometry. Sometimes a plumb bob may be used instead of a level.

#### c. Note and Compare:

When the angles are noted, compare them on opposite sides of the ship by subtracting the lesser angle. The remainder is the degree of lean.

#### d. Planking Sag:

To measure planking sag use a fairing batten. This can be a piece of clear straight wood 20 mm ( $\frac{3}{4}$ ") by 38 mm ( $1\frac{1}{2}$ "). It should be at least 4.9 m (16'-0") long or long enough to fit past two sets of bilge blocks. If suitable wood cannot be obtained, a long piece of metal of suitable stiffness can be used.

Lay the batten against the hull so that it naturally follows the curve of the hull. Where the hull has been deflected inward by the support system or outward by internal loading, the fairing batten will not naturally lie flat. Measure the distance it tends to remain away from the hull at the greatest point and record these points on a drawing. This should be done wherever any sag in the hull or decks of the ship is noted.



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## 8.0 RECOMMENDATIONS

### 8.1 JURISDICTIONAL REQUIREMENTS

The report will be useful as far as it is authoritative. The following practices should be included:

- a. Cover all points, preferably in the order in which they appear in this article.
- b. State exactly what you see. Do not make any judgments concerning the strength of any member unless you are authorized and able to show relevant figures or calculations.

It is best to recommend that a structural engineering investigation be carried out, for a suspect area, by the most experienced marine restoration authority or structural engineer available.

- c. Do not comment on the feasibility of restoration or conservation on the vessel or any portion of it unless input can be obtained from the persons who will be responsible for the restoration or conservation design.
- d. Do not comment on the names or uses of parts of the ship or machinery. If people who appear qualified volunteer information, take note of their name, address, phone number and list them in an appendix as "local resource people."
- e. If the decision to restore or conserve the vessel has been made, recommend, in conjunction with the designers:
  - Heritage recording
  - Fire and safety improvements as required
  - Interim stabilization.



*Rot, scag, twist, sprung planking on wood ship.*

## 8.2 STANDARDS AND TESTING

### 8.2.1 *Testing*

If the structural strength of any particular member or component is suspect, recommend an engineering investigation.

Testing to identify materials should be carried out and strength testing for rope, chain or wire should be done and included in the report if possible.

Samples should be taken according to 5.5 above.

Testing required for different types of machines can vary drastically depending on the materials and methods of their construction and the technology available at the time. For specialized machinery, it is often necessary to hire a specialized tradesman or professional to carry out the tests.

Tests may involve the use of moisture meters, hygrothermographs, strain gauges, ultrasonic testing and radiography.

### 8.2.2 *Operational Standards*

Many authorities regulate or set standards for ships and their various components. Any relevant standards pertaining to the vessel should be included in a bibliography at the end of the report.

A separate list should be made for standards that affect the vessel as it is now and as it might be when viewed by the general public.

## 8.3 INTERIM STABILIZATION

The primary cause of damage to a wooden hull is fungal attack or rot. To inhibit or stop the rot, the moisture content of the wood should be brought down to about ten percent to 12 percent. The best way to do this is to keep the rain or snow out and let as much dry air in as possible.

If the decks cannot be waterproofed as they were originally, a shelter should be built to keep the rain off. Such a shelter should be as light as possible. It should be fastened in such a way as to not damage original material. It should allow as much ventilation as possible around the vessel.

Additional openings, particularly in the hull, should be utilized for ventilation. Openings should have adequate shielding from the rain and screens to keep out birds and insects.

If the vessel is afloat, an electric fan should be installed on one of the hatches and other ones opened so that air can be circulated through the vessel. This should be done continuously except on rainy days.

If rot or fungal attack is apparent, take photographs and have samples analyzed to find the specific variety. The restoration designer should then recommend any fungicides to be used. The fungicides must be compatible with all stabilization compounds to be specified in the restoration design and acceptable under government safety guidelines.

*Illustrations are the property of the Heritage Conservation Program, unless otherwise noted.*

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## 9.0 APPENDIX

### 9.1 APPENDIX 1

EC

#### REPORT OF SURVEY OF VESSEL'S STRUCTURE

Name \_\_\_\_\_

Type of Vessel \_\_\_\_\_

Construction \_\_\_\_\_

Date Built \_\_\_\_\_ Where Built \_\_\_\_\_

Characteristics \_\_\_\_\_

Date this Survey Commenced \_\_\_\_\_ Date Completed \_\_\_\_\_

Vessel Setting/Draft \_\_\_\_\_

- Part I Brief report of condition of hull  
Part II Report of survey of structure  
Part III Report of dry survey  
Part IV Report of gas freeing/air tests of compartment

#### CERTIFICATE

The whole of the vessel's structure has been surveyed and all accessible areas affecting the water tightness and structural integrity of the vessel have been examined as shown on Part I/Part II of this form.

The dry survey has/has not been carried out and the report of this survey is shown in Part III.

Gas freeing and air testing of watertight compartments have/have not been carried out and the results of these tests are shown in Part IV.

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Project Manager

---

Surveying Officer

**PART I**

**BRIEF REPORT OF CONDITION OF HULL (INTERIOR)**

PLATING/PLANKING \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

FRAMES \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

DECKS \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

BULKHEADS \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Note: Condition survey reports of vessels of wood construction should contain details concerning condition of fastenings and caulking and investigation for deterioration from fungal or insect attack.

**PART II****REPORT OF SURVEY OF STRUCTURE, W.T. DOORS, HATCHES, ETC.**

## Item Checklist

- |                                  |                                 |
|----------------------------------|---------------------------------|
| a. Structure _____               | b. W.T. Doors and Hatches _____ |
| c. Preservation (Coatings) _____ | d. Deck Coverings _____         |
| e. Piping _____                  | f. Masts and Rigging _____      |

Compartment \_\_\_\_\_

Survey-Date \_\_\_\_\_

Station \_\_\_\_\_

Deck \_\_\_\_\_

Item Defects and Action Recommended \_\_\_\_\_

Compartment \_\_\_\_\_

Survey-Date \_\_\_\_\_

Station \_\_\_\_\_

Deck \_\_\_\_\_

Item Defects and Action Recommended \_\_\_\_\_

Compartment \_\_\_\_\_

Survey-Date \_\_\_\_\_

Station \_\_\_\_\_

Decks \_\_\_\_\_

Item Defects and Action Recommended \_\_\_\_\_

Note: Frame stations are to be numbered from the stem to stern, with port or starboard specified. Decks are to be designated by letter from keel up. Planking/plating shall be lettered from each side of the keel, i.e. garboard strake shall be "A" strake.



**PART III**  
**REPORT OF DRY SURVEY VESSEL**

Shell Plating/Planking (Starboard) \_\_\_\_\_

\_\_\_\_\_

Shell Plating/Planking (Port) \_\_\_\_\_

\_\_\_\_\_

Main Inlets and Discharges \_\_\_\_\_

\_\_\_\_\_

Auxiliary Inlets and Discharges \_\_\_\_\_

\_\_\_\_\_

Rudders and Propellers \_\_\_\_\_

\_\_\_\_\_

Brackets and Shafting \_\_\_\_\_

\_\_\_\_\_

Eddy Plates and Rope Guards \_\_\_\_\_

\_\_\_\_\_

Cathodic Protection \_\_\_\_\_

\_\_\_\_\_

Other Underwater Fittings (list) \_\_\_\_\_

\_\_\_\_\_

**PART IV**

**REPORT OF GAS FREEING/OR AIR TESTS OF TANKS**

The machinery inspection is limited to tanks not part of the vessel's hull: lub oil tanks, settling tanks, ready use tanks, feed tanks, etc.

Compartment and Where Situated \_\_\_\_\_

Gas Test \_\_\_\_\_

Air Test \_\_\_\_\_

Test Pressure \_\_\_\_\_

Result of Test \_\_\_\_\_

Date \_\_\_\_\_

## 9.2 APPENDIX 2

## EC

**REPORT OF SURVEY OF VESSEL'S MACHINERY**

Name \_\_\_\_\_

Type of Vessel \_\_\_\_\_

Construction \_\_\_\_\_

Date Built \_\_\_\_\_ Where Built \_\_\_\_\_

Characteristics \_\_\_\_\_

Date this Survey Commenced \_\_\_\_\_ Date Completed \_\_\_\_\_

Vessel Setting/Draft \_\_\_\_\_

Part I Brief report of condition of hull where it supports machinery

Part II Report of survey of machinery spaces

Part III Report of dry survey (machinery)

Part IV Report of gas freeing/air tests of tanks

Part V Report of survey of machinery

**CERTIFICATE**

The whole of the vessel's machinery has been surveyed and all accessible areas affecting the water tightness and structural integrity of the vessel have been examined as shown on Part I/Part II of this form.

The dry survey has/has not been carried out and the report of this survey is shown in Part III.

Gas freeing and air testing of watertight compartments and self-contained tanks have/have not been carried out and the results of these tests are shown in Part IV.

\_\_\_\_\_  
Project Manager\_\_\_\_\_  
Surveying Officer

**PART I**

**BRIEF REPORT OF CONDITION OF HULL WHERE IT SUPPORTS MACHINERY ELEMENTS**

PLATING/PLANKING \_\_\_\_\_

---

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FRAMES \_\_\_\_\_

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---

---

---

DECKS \_\_\_\_\_

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---

---

BULKHEADS/BULKHEAD GLANDS \_\_\_\_\_

---

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Note: Condition survey reports of vessels of wood construction should contain details concerning condition of engine foundations, bed plates, fastenings, and drip trays if fitted, and include investigation for deterioration from corrosion and fungal attack of these members.

## PART II

## REPORT OF SURVEY OF MACHINERY SPACES

## Item Checklist

- |                                  |  |
|----------------------------------|--|
| a. Structure _____               | b. W.T. Doors and Hatches (sizes only) _____ |
| c. Preservation (coatings) _____ | d. Deck Coverings _____                      |
| e. Piping _____                  | f. Self-contained Tanks _____                |

Compartment \_\_\_\_\_

Survey-Date \_\_\_\_\_

Station \_\_\_\_\_

Deck \_\_\_\_\_

List and Describe (add suitable sketches if convenient) all machinery located in this space. Itemize defects and action recommended.

Compartment \_\_\_\_\_

Survey-Date \_\_\_\_\_

Station \_\_\_\_\_

Deck \_\_\_\_\_

List and Describe (add suitable sketches if convenient) all machinery located in this space. Itemize defects and action recommended.

Compartment \_\_\_\_\_

Survey-Date \_\_\_\_\_

Station \_\_\_\_\_

Decks \_\_\_\_\_

List and Describe (add suitable sketches if convenient) all machinery located in this space. Itemize defects and action recommended.

Note: Frame stations are to be numbered from the stem to stern, with port or starboard specified. Decks are to be designated by letter from keel up. Planking/plating shall be lettered from each side of the keel, i.e. garboard strake shall be "A" strake.



**PART III**

**REPORT OF DRY SURVEY (MACHINERY)**

Stern Gland and Packing \_\_\_\_\_

\_\_\_\_\_

Main Inlets and Discharges \_\_\_\_\_

\_\_\_\_\_

Auxiliary Inlets and Discharges \_\_\_\_\_

\_\_\_\_\_

Rudders and Propellers \_\_\_\_\_

\_\_\_\_\_

Brackets and Shafting \_\_\_\_\_

\_\_\_\_\_

Eddy Plates and Rope Guards \_\_\_\_\_

\_\_\_\_\_

Cathodic Protection \_\_\_\_\_

\_\_\_\_\_

Other Underwater Fittings (list) \_\_\_\_\_

\_\_\_\_\_

Other Through-hull Fittings (list) \_\_\_\_\_

\_\_\_\_\_

**PART IV**  
**REPORT OF GAS FREEING/OR AIR TESTS OF TANKS**

The machinery inspection is limited to tanks not part of the vessel's hull: lub oil tanks, settling tanks, ready use tanks, feed tanks, etc.

Compartment and Where Situated \_\_\_\_\_

Gas Test \_\_\_\_\_

Air Test \_\_\_\_\_

Test Pressure \_\_\_\_\_

Result of Test \_\_\_\_\_

Date \_\_\_\_\_

**PART V****REPORT OF SURVEY OF MACHINERY**

Main Engine/s \_\_\_\_\_

Type \_\_\_\_\_

Manufacturer \_\_\_\_\_

Designer \_\_\_\_\_

Construction \_\_\_\_\_

Date Built \_\_\_\_\_ Where Built \_\_\_\_\_

Characteristics \_\_\_\_\_

Name plate data in full including model numbers, serial numbers and patent numbers if shown. Describe all major defects, missing parts, pipes, etc.

Main Boiler/s \_\_\_\_\_

Type \_\_\_\_\_

Manufacturer \_\_\_\_\_

Designer \_\_\_\_\_

Construction \_\_\_\_\_

Date Built \_\_\_\_\_ Where Built \_\_\_\_\_

Characteristics \_\_\_\_\_

Name plate data in full including model numbers, serial numbers and patent numbers if shown, working condition and test pressures. Describe all defects, missing parts, pipes, etc.

**AUXILIARY MACHINERY AND BOILERS**

To be listed and described as shown in above examples. Pipe systems and interconnections to be followed through in logical sequence; note: it is not intended that pipe systems be drawn.

Note: Cross-reference each machine listed to the proper machinery space.

# **VOLUME III**

# **HISTORIC SITE**

# **ANALYSIS**

## **7.3**

## **INVESTIGATION AND ANALYSIS OF**

## **MARINE AND INDUSTRIAL SITES**

### **INDUSTRIAL SITES**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
OTTAWA (819) 997-9022

ORIGINAL DRAFT: A. WILDSMITH

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## 1.0 INTRODUCTION

Industrial sites of historical and architectural significance held by the Canadian Parks Service (CPS) are from different periods, in widely variant forms, in vastly different environments, of various sizes and representative of a cross section of Canadian themes. Because of this, there is no set formula to follow when carrying out an investigation of a particular industrial site. Each investigation must be tailored to the individual project and to its planning and design needs. The common aspect of these investigations is the need for a technical description of the infrastructures and the complexes that house equipment and machinery, in addition to the survey of the equipment and machinery themselves. For technical considerations in connection with machinery see Section 7.1 "Investigation of Period Machinery."

### 1.1 PURPOSE

This article provides a technical overview of the investigative process for industrial sites, without providing complex detail on the special problems which will appear in relation to particular sites. It is a general guide intended for use by managers, planners, engineers, architects and technologists engaged in planning or in conducting an investigation of an industrial site of historic interest.

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## 2.0 PREPARING FOR AN INVESTIGATION

### 2.1 TERMS OF REFERENCE

The project manager is normally responsible for drawing up the terms of reference for an investigation of a specific historic site. That document is intended to define and describe the exact



*Gulf of Georgia Cannery, BC*

nature of the job, the limitations of the survey and the format for reporting the findings. It also provides work schedules and deadline dates.

Other items in the terms of reference will depend on the relationship with the examiner (consultant, in-house personnel, other government agency) and the flexibility of the task to be executed. The technical person(s) who will be responsible for conducting the investigation must be aware of the principles of heritage conservation, as well as have a knowledge of industrial sites, including the industrial engineering practices, the architectural principles and the construction methods traditionally used in industrial sites of the period. When the terms of reference are agreed upon, they become the primary directive for the duration of the investigation project.

## 2.2 BACKGROUND PROJECT DOCUMENTATION AND INFORMATION

Before proceeding with the on-site investigation, the surveyor (normally an architect or engineer) should gather existing relevant documentation. This information should be assembled in collaboration with other specialists of the project team. The historians, architects and engineers work together, not independently. The information should include all historical and contemporary records and other material which might give an insight into past problems, recent maintenance and present status.

Various historic industrial sites in the CPS system have been previously surveyed. While the findings may be incomplete or superficial, they form a valuable record which should always be reviewed by the inspection authority during the investigation.

## 2.3 SITE PRELIMINARIES

When the development work on an industrial site is anticipated to be extensive or complex, the inspector should make arrangements with the site authorities for a preliminary visit to become familiar with the site before deciding the details of work procedures and schedules. Note should be taken of all items which would require the assistance of technical specialists (e.g. mechanical, heating, ventilating and electrical). It may be important at this time to identify specialized installations in each structure, such as special material handling equipment and elevators.

Other particulars to be recorded should include potential failure of structural elements, layout of site including drainage patterns, location of services and conditions of access.

## 3.0 ASSESSMENT OF AN INDUSTRIAL SITE

### 3.1 TOOLS AND OFFICE SUPPLIES

The following tools represent items which may be needed from time to time during investigations:

- a. Hardhat and safety boots:  
These should be worn throughout the investigation. Most provinces and territories have safety legislation which requires that both of these be worn at all times.
- b. Proper clothing:  
Appropriate clothing is essential. Industrial sites are generally dirty and often work is carried out in cold, windy weather. Clothing that is supplied or selected should be comfortable, provide protection from the elements and be able to stand up to wear and tear.
- c. Level, plumb bob, mirror, binoculars:  
A pocket-size level and small plumb bob are usually sufficient to determine whether elements are out of plumb or level. Except for items where extreme accuracy is required, deflections which cannot be detected by the plumb bob and pocket level are probably not serious enough to warrant attention at the initial investigation stage of the project.  
Mirrors are very handy for checking inaccessible areas, such as low clearance items. Binoculars are most commonly used for external inspection of roofs, gutters, downspouts and other inaccessible elements.
- d. Penknife, camera, powerful flashlight:  
A penknife is handy for probing and scraping materials. A camera is a significant inspection tool. Field photographs supplement notes and aid in the preparation of technical descriptions and analysis. An automatic (focus and aperture) 35 mm camera with flash is adequate for most applications. A light-weight video camera-recorder is also a useful piece of equipment to record verbal descriptions (and background sound of operating machinery, etc.) as well as visual images. A pocket audio recorder can also be used to record verbal descriptions. A powerful flashlight is a must. Existing lighting is often insufficient for detailed inspection or has been relocated leaving an area to be inspected in darkness.



*Watercolour of the plant of Hiram Walker and Sons, 1891. (Courtesy of Hiram Walker and Sons)*

In addition to these tools, certain specialist aids pertinent to inspection of industrial sites could include:

- a. **Protimeter Digital Diagnostic Instrument:**  
A moisture meter (hygrometer), a thermometer and a salt detector.
- b. **Ranging Optical Tapemeasure:**  
This aid permits one person to quickly take interior and exterior dimensions and makes close estimates of distance to an accuracy of 96.7 percent at 200 m.
- c. **Panasonic Lightscope:**  
A portable (pocket-size) microscope of 30 power magnification.

In addition to these tools and aids, the inspector should have: notebook, pencils, pocket calculator and checklists. The notebook (or camera-recorder) is the most important item that an inspector brings on site, next to experience and knowledge.

### 3.2 SITE AND SETTING

A full investigation of a site and structure(s) goes beyond the scope of this article. However, basic information of location and physical surroundings should be included, such as:

- a. **Location:**  
An industrial site may have only one structure on it, such as a lighthouse, factory or a small mill. Or it may be a complex assemblage of work places, such as machinery shops, blacksmith shops, boiler rooms and other support facilities. Some may be intact, whilst others are represented by ruins or the remains of foundation walls. When the surveyor investigates the site, each and every structure should be dealt with individually and identified on a topographical map or site plan.

The number and name of the street or road on which the structures are located should be recorded. If the road has a number rather than a name, indicate whether it is a provincial, county or national route. If the industrial site is not located directly on a street, the names of the nearest roads or natural features and the site's distance from them should be noted. The site's historic name and common name, caretaker's or owner's name, the city or town and the province should also be recorded.

- b. **Physical Environment:**  
Describe the layout of the land and natural features of interest. Note the general characteristics of the soil and the



subsurface conditions. Provide important climatic data, particularly those that would have affected the design, construction or operation of the site. Decide if it is necessary to recommend additional tests to ascertain more detailed information.

c. Access and Utilities:

Record usable access provisions and utilities both inside and outside the site boundaries – railways, waterways, roads, public utilities (energy, potable water, sewage) and services that might be required during the technical investigation, such as electrical power, water, garbage removal, etc.

d. Fire, Safety and Security:

Consider provisions for and problems of, site security, personnel safety, material hazards, flooding, collapse, fire detection and fire protection.

### 3.3 TECHNICAL DESCRIPTION

The general technical description of the structures inside the site should be established, using appropriate technical terms and standard (SI) units of measurements. It should include such information as type of structures, main exterior elements, including foundations and supports, nature of surrounding soil, general details of construction, overall dimensions, building functions, types of machinery housed, structural capacity and relative age of the different structures and elements.

It is often beneficial to illustrate on a site plan how groups of structures are placed together, the relationship between them and between buildings and the terrain and terrain details and features of importance.

### 3.4 HISTORICAL PERSPECTIVE

The industrial site to be assessed will show evidence of its age, as well as evidence of change. Industrial sites, such as light-houses, railway round-houses and machine shops that have survived harsh winters, hot summers and natural humidity may be in fair to good condition with only minor changes required to serve additional functions. In other cases they may be in ruins, brought down by demolition or by extensive deterioration over time. It is important that a clear historical perspective

be established, both as a means of understanding physical evolution and present condition and as a basis for conservation design and development. During the examination, note information on plaques, corner stones and inscriptions, as well as any change in the internal arrangements and machinery locations.

Record major design features. The surveyor should recognize qualities within the site that appear to be unique or significant and these observations should be recorded for future reference and evaluation. This should include period of construction, function, builder and historically significant events.

### 3.5 ASSESSMENT OF PRESENT CONDITION

Following the technical description and the historical perspective, the examiner should note the present condition of the individual areas and of the linkages between the various buildings, structures, sites, objects and spaces, including if possible, the data and sequence of their construction and any signs of alterations, additions, modifications and extensions which might give further clues to their history.

Note all the signs of material deterioration and defects and the failure of structural systems, elements and connections. Note size, condition and pattern of cracks. Deformation of structural elements of metal or wood, such as beams, floors and buckled columns should be carefully inspected to uncover the evidence of cause, significance and possibility of future remedy. All defence against the weather should be given close inspection. Special attention should be given to damage of fastening materials because of galvanic action which may have arisen if dissimilar metals were employed close to one another. Mortar and binding materials should be checked for friability, poor adherence to masonry, cracking and spalling. For wooden elements, report fungal and insect activity, weathering, abrasion and impact damage which may impair the structural quality of the elements.

Above all, the inspector should draw attention to the basic deficiencies found within the structures. The requirements for further protection should always be given high priority.

---

#### 4.0 CONCLUSIONS AND RECOMMENDATIONS

The primary goal of an investigation report is to provide a clear overview of the historical and physical condition of the site under consideration. The surveyor should compare the results of the physical investigation with the findings from other disciplines, noting any area of uncertainty which may need clarification. After finalizing the assessment, make recommendations on the need for additional investigations and on the options for conservation treatment. In preparing recommendations for physical interventions, distinguish between immediate requirements designed to arrest the active forces of deterioration on the site and suggestions for long-term development designed to enhance the significant aspects of the industrial complex. In each case, Class "D" or "C" cost estimates may be included.

---

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**VOLUME III**  
**HISTORIC SITE**  
**ANALYSIS**

**8**  
**INVESTIGATION AND ANALYSIS**  
**OF LANDSCAPES**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
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ORIGINAL DRAFT: LINDA FARDIN AND GILLES ROY

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## 3.0 BIBLIOGRAPHY

## 1.0 INTRODUCTION

This article outlines the major steps involved in the process of investigating historic site landscapes. This is a relatively new field in Canada, still subject to development and improvement, especially in the area of investigative techniques.

Investigation of the landscape is of prime importance in the overall process of preserving a historic site. Investigation fully justifies the operational costs entailed, since it seeks at the outset to reveal all important surviving landscape elements, to provide clues for the correct interpretation of site development and to help determine those fragile elements that should be stored as historic artifacts. These include mainly historic plants, which are likely to disappear from the site once stabilization or other work has begun.

### 1.1 BACKGROUND

Unlike other, longer-established forms of cultural heritage, the value of cultural landscapes and other historic landscape elements is only beginning to gain recognition in Canada. In the last few years, however, there has been a growing movement to promote the importance of historic landscapes.

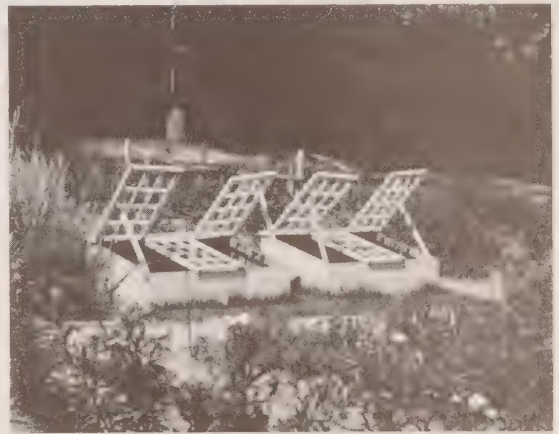
Historic landscapes are an integral part of our past. Landscape, by its very nature, is constantly growing and changing (Stewart, 1978) in space and structure to reflect the needs of its residents or new fashions. Landscape is therefore like a parchment on which the inhabitants of an area inscribe their way of life, altering the marks made by previous generations. Buildings and other constructions of one period are often disguised or buried under the additions of later generations.

With perpetual changes occurring, the appearance of a site as found in the investigation, is often quite different from its original configuration. Even on an apparently intact site, it may take only a quick walk over the grounds and an analysis of historic documents, to realize that numerous transformations have been made. Few of the historic and cultural landscapes in existence today were created in one fell swoop; fewer still received regular maintenance in the years following their creation. The fundamental concept of ongoing development should therefore be clearly understood by the investigator or preservation team charged with the task of giving new life to a historic site. Any space in which the existing landscape elements suggest a historical antecedent should not be altered without being properly observed, analyzed and surveyed graphically, so that it can be fully inventoried.

### 1.2 SCOPE

This article is intended for landscape architects, historians, planners and other professionals having a particular interest in the preservation of period landscapes.

It describes, explains and summarizes various steps involved in carrying out an investigation of a historic site. As the scope of the material is vast and the field of historic site investigation new, only a few of the most important techniques are covered.



*Cold Frames, Bellevue House, Kingston, ON*

## 2.0 INVESTIGATION

### 2.1 STEPS IN INVESTIGATION

The investigation generally involves four steps:

- a. gathering of data from historical records and on site;
- b. evaluation and interpretation of data gathered;
- c. analysis and compilation of data from step "b"; and
- d. drafting of a report systematically describing research done in "a", "b" and "c" (that is, summary of historical and physical conditions on the site), with a conclusion and short-, medium- and long-term recommendations for the planning and future development of the site.

### 2.2 PURPOSE OF INVESTIGATION

As a general rule, investigations of a historic site will seek to discover, understand and elucidate previous activities on the site.

The results of this investigation will enable a logical analysis to be made of the site under study and will serve principally to:

- a. produce an inventory of landscape elements for compilation and reference, thus creating a permanent file on the historic landscape (e.g. fences, trellises, tiling);
- b. understand the influence of human beings on the landscape and the influence of the environment on human beings (e.g. structure and space design, the relationship of human beings to surrounding buildings);
- c. gain a better understanding of the development of the landscape and its elements, from its creation up to the present;
- d. classify the site according to its importance and nature of the data. Period gardens may have responded to the particular needs of an individual or group or to other circumstances. The data gathered may establish the site as having minimal or immense historical importance, an importance that could not be clearly established otherwise; and
- e. support development programs and facilitate the creation of planning options for the future of the site.

Although the Canadian Parks Service (CPS) has acquired a wide variety of historic sites, the purpose of investigation is substantially the same for each. The investigator should clearly define the site investigation before proceeding with site research and keep in mind its relation to other project investigations and anticipated results. This enables the investigator to accurately determine the human and financial resources needed for the project and the type and scope of investigation to be conducted. Those in charge of the project should approve these objectives and ensure that they meet the project's design and planning requirements.

## 2.3 SCOPE OF INVESTIGATION

The scope of the investigation will primarily be governed by the following:

- specific requirements of the project (what are the anticipated future developments?)
- staff and time allocations for the project
- on-site conditions
- existing data

## 2.4 PREPARATORY STUDIES

Time permitting, the investigator should carry out certain preparatory studies before beginning the physical investigation on site. If not feasible, the studies may be done during or even after the on-site inventory. The importance of such studies should not be underestimated, however, as they enable the investigator to gain an initial familiarity with the developmental changes on the site. They may also provide useful clues on the siting of original elements in the present landscape.

The investigator should first find out whether previous studies of the site exist so as not to duplicate research efforts. Previous studies may have been prepared by any of a number of preservation specialists such as historians, archaeologists, architects or other landscape architects. Even if these studies do not always yield information directly connected to landscapes and gardens, they may identify buildings and other structures on the site and their relation to the landscape; describe life at the time; reveal who lived on the site and their social activities; disclose periods of major change; and indicate the type and frequency of use of the site.

Where no relevant research on the site has been done, the investigator will have to locate the available sources of information. (It is highly recommended that the investigator set a time limit for such research at the outset, as it can easily take several months or more.)

The following sources of information are useful in the research and documentation stages.

### 2.4.1 Pictorial Documents

#### a. Photographs:

Photography, invented in the 1850s, was commonly used by the end of the century. Photography is one of the best sources of historical landscape data, because of certain intrinsic advantages. First, photographs provide details of vegetation (arrangement, types) and construction methods and materials (tiling patterns, wood joinery) – these are often of key importance in restoration projects. Second, such information is passed on directly to the investigator without too much risk of error in interpretation. All that requires checking are the dates shown in historical records and on photographs. Third, original photographs may be easily reprinted or enlarged to serve various purposes.



Period photographs are available from public or government libraries, public archives, national historical societies, museums or private collections. They may also be found in buildings associated with the site.



*Site Survey. Cemetery at Batoche, SK*

b. Landscape drawings, engravings and paintings:

Landscapes, whether unplanned (natural) or planned, have long fascinated artists as subjects of works of art. Before the advent of photography, landscapes were widely depicted in drawings, engravings and paintings (and, of course, still are today). They are the only pictorial documents available to us before the invention of photography.

Although these works will familiarize the investigator with the lifestyle of a certain period, he or she should be suspicious about the authenticity of some of their details. The artist may have taken artistic licence in rendering the scene. Nevertheless, the general character of these works is interesting and merits consideration as a record of the time and place under study. They create an overall impression that photographs can only rarely capture.

c. Maps and plans:

Period maps and plans provide a great deal of relevant information on the spatial configuration of an area.

Some maps and plans date from the beginning of Canadian colonization and often clearly show elements such as private space versus public space, gardens and roadways. Maps dating from the 18th and 19th centuries indicate the

locations of dwellings and sometimes even list residents' names. These names, associated with towns, villages, residences, areas under cultivation and waterways can reveal a great deal about the history of the site.

Research on the creator of a map or plan and on why it was drawn may provide information on its relative authenticity. Again, the investigator should be skeptical of the details it contains and should make additional, comparative studies of other plans and pictorial documents of the same period before reaching any final conclusions.

When all the period maps and plans have been gathered, they should be traced in the same scale onto transparent or semi-opaque paper. Common elements on the different maps and plans (buildings, property lines, waterways) will be helpful in understanding the major alterations to the site in the periods under study. The maps and plans can also be enlarged either photographically or with an epidiascope or manually (the latter method involves a higher degree of error than the other two).

#### 2.4.2 Manuscripts

Manuscripts, including daily and weekly newspapers, personal diaries, letters and notes, travellers' accounts, books and treatises are an invaluable source of information. As a general rule, they reveal more about the way the site was used than about its actual spatial configuration.

The following is a rather technical account from one such manuscript:

It will not be long until it is time to start the hot bed. Every farmer should have one. If you haven't one, set to work and make one. Many farmers have old sash lying around that would make good glass for a hot bed. Sometimes, old storm sash can be obtained cheaply and they answer well. Having selected your sash, make a frame to suit it. Anyone handy with tools can make a good frame.

Some time before you are ready to use the hot bed, make up a pile of good stable manure (largely horse manure) large enough to cover the entire bottom of the intended hot bed eighteen inches deep. Let it heat a few days, then turn it over and let it heat another week. Now, make up a bed of this manure eighteen

inches deep. Let it heat a few days, then turn it over and let it heat another week. Now, make up a bed of this manure eighteen inches deep and a foot larger all round than the size of your frame; water and tramp it down solid. Place the frame upon it and bank up around the manure and frame with more manure. On top of the manure in the frame put in five inches of fine garden mould. No matter if it is frozen, it will soon thaw out. If you can't get that, go the woods and get some nice leaf mould. Put on the glass and allow the hot bed to work off its excessive heat. Place a thermometer in the soil and when temperature remains constant at 80°F, the ground can be got ready for sowing and the seed put in. If the temperature is too high, wait until it cools down or the plants will be burned out. Sow radishes and lettuce for the first crop; cabbage, cauliflower, tomatoes, etc., can come on for a second crop.

As soon as the sun's heat begins to warm up the bed and the temperature rises, it may be necessary to open the sash a little to regulate it. But this can soon be learned and a great deal of pleasure and profit will be obtained from the hot bed! ["The Hot Bed," *Nor' West Farmer*, Vol. 16, No. 4 (April 1898), p. 175].

The following is a more descriptive account from *Nos Messieurs* written by Rév. Olivier Maurault in 1936, regarding The Sulpician Seminary, Montréal:

[Translation]

The Savages' fort then became exclusively the "Gentlemen's Château." Little by little it was embellished: a main building of stone housed two cider presses; a stable and a chicken-coop were built; a park of twenty-four acres was created, a vegetable garden of half an acre, an orchard of twelve acres and a vineyard of four acres, all wholly walled in.

As late as 1778, this fine property occupied the space presently bounded by Dorchester Street, Côte des Neiges Road, Wood Avenue and an enclave to the northeast, Westmount Boulevard and Greene Avenue.

Over the years, repairs to the buildings were necessary, as might be expected: in 1797, the towers, the

terrace and the steps leading to the building, the summerhouse at the top of the orchard and the press were repaired; and the chapel having collapsed, it was necessary to demolish the remains. In 1801, the canal (which still exists under the tall trees of the Great Seminary) was cleaned and rebuilt; in 1802, the Gentlemen set to work clearing the park and the meadow of trees and the fountain and water spout that were the pride of M. de Belmont were rebuilt; in 1825, a storey was added to the main building of the Château. (Maurault, pp. 56-57)

## 2.5 PREPARATORY MEASURES

As stated earlier, period landscapes react sharply to the effects of various forces of deterioration, some of them essentially uncontrollable. The landscape's physical condition never remains stable. For this reason, steps to ensure the general security, stabilization and protection of the landscape should be taken as soon as the site is acquired, so that its condition does not deteriorate further. However, none of these measures should affect the existing original fabric of the site nor should they be harmful to future development of the site.

Accordingly, as soon as the site is sheltered from most of the destructive elements in the environment and preservation is feasible, the various professionals involved in the project may begin their investigation. To this end, the following measures are essential to successful completion of this work:

- a. Do not in any case clean up the site before as-found surveys of the site (maps, documents, photographs and observations) have been completed. The interpretation of fabricated and natural elements in their existing state may lead to important conclusions (e.g. the ruins of a stone wall, pieces of wood in a pile, a planting group or unevenness in the ground profile).
- b. Before and during the investigation, rigidly control visitors' physical access to the site (these include all other staff members interested in the site such as archaeologists, architects, engineers and contractors).
- c. Promptly set up temporary protection for the fabricated elements of the landscape ("hard landscape," e.g. wooden fences, brick paths or retaining walls). Ensure that they are stabilized if their physical condition is critical.
- d. Quickly set up temporary protection for the natural elements of the landscape ("soft landscape"). This can

be a delicate operation because it involves practical solutions applicable to ecological form. Such protection should be conducted only if necessary. Special attention should be paid to cutting trees and shrubs, the use of fertilizers and insecticides, alteration of drainage patterns, erosion control and so on. A philosophy consistent with the overall project should guide the direction of such changes.

- e. Introduce a temporary maintenance program only after the investigation has been completed. Be careful not to cause any noticeable damage to landscape elements either fabricated or natural.
- f. Clearly identify the particular constraints of the site which may noticeably affect the investigation. These constraints should be constantly related to the type and extent of anticipated modifications, availability of information, project schedule, existing condition of the site and its natural elements.
- g. Co-ordinate the work with architectural, engineering, historical or other investigations which may be going on simultaneously, so as not to hinder other investigations in progress or cause unnecessary or irremediable damage to the site.
- h. Set up a realistic schedule of site visits.
- i. Ensure the ongoing safety and security of the site. These measures should be adopted before work begins and kept in place until completion of the investigation.

It is recommended that investigation of a historic landscape begin with general observations and a brief tour of the site. The investigator will then study certain sectors. In this way, the site analysis will be more complete and the chance of losing sight of the essence of the project will be reduced.

## 2.6 SITE SURVEY

In its current form, analysis of urban and rural landscapes provides a great deal of information of the history of these sites. As they are changing today at a breathtaking rate, they must be surveyed and inventoried as quickly as possible.

Accordingly, the first step in the field is to accurately survey existing elements in their current condition. This survey, which is done following a careful examination of the site, helps establish an accurate relationship between the various elements found.

The scope of the landscape survey will vary from site to site, according to its size, contents and known historical profile, as well as the rationale behind the survey. The human and financial

resources and time allotted will also influence its scope. In most cases, documents produced during and after the inventory stage are the only reliable source that will show the site configuration before stabilization, preservation or restoration has begun.

The investigation should ideally be carried out in several stages at different seasons, as soon as site visits are permissible. Surveys done in the fall, when vegetation is dormant or in spring, when plant growth is just beginning, yield the best results. It is also in spring and fall that the soil is dampest, which promotes the appearance of crop marks. These marks are visible in open fields and are generally caused by the physical qualities of the subsoil, including its depth, moisture and organic content (Stewart 1978). An investigation conducted in summer is also feasible, although data gathering is hampered somewhat by the abundance of foliage obstructing views or masking elements such as wells.



*Victorian Cemetery Gate, Upper Clements, NS*



The equipment required on site to carry out a survey and inventory varies considerably with each project. Certain items of equipment, however, are essential for all projects.

- a. camera and film, preferably colour (a ruler or other object is also useful in indicating scale in a photograph);
- b. plant press (cardboard, newsprint, adjustable press ends – with descriptions and photographs of specimens);
- c. topographic map and site plan, if available;
- d. reference books for identifying plants, soil and so on;
- e. notebook, graph paper, coloured felt-tip pens;
- f. one-gallon measuring container; and
- g. plastic bags for carrying artifacts.

All information gathered in this stage should be recorded legibly on a plan. Before drawing the plan the investigator should walk around the entire site to obtain a clear idea of its size and to determine the major landscape elements to be inventoried. It is preferable to first draw the broad outlines of the landscape and later fill in the details. When the site plan has been completed, the investigator should return to the site and double check to ensure that the plan corresponds exactly to the existing site. This final site plan should be traced accurately and in detail.

When preparing the final site plan, transparent paper (or plastic film) is recommended because it reproduces better when printed and lasts longer in storage. Also, the site plan should be squared off to facilitate on-site work. The investigator may then refer to this grid plan in reports and notes.

A site plan drawn to a scale of 1:125 (1"=10') is recommended; if the size of the site requires a smaller scale, 1:250 (1"=20') is also satisfactory. Sections of the map that include much more detail should be drawn on a separate enlarged plan. Along with the site plan, best labelled "as-found," provide other visual material giving further details on the research such as photographs (two-dimensional) that will provide additional information complementing that on the plan. The visual documents should include:

a. Overall views:

These clearly show the general character of the site and the interrelationship between landscape elements (may be 180°, 270° or 360° panoramas).

b. Detail views:

Photographs should record landscaping details such as vegetation, stone walls and fountains. Colour film is recommended to illustrate contrasts between plant species, for

example. Each shot should appear on a reference plan, indicating where the photograph was taken and the direction the camera was facing.

c. Construction drawings:

A large number of built elements on site merit accurate survey. Drawings should include dimensions of the structure and specifications of materials and assembly. The drawings should also be accompanied by notes describing the condition of the structure (e.g. wood, paint, masonry) and should include plans, cross sections and elevations. They may also be accompanied by photographs of the objects in question or photographs from which sketches may be made.

d. Location sketches:

Time permitting, making location sketches is a good idea because they give a quick impression of the site and may prove useful in developing the design concept.

The following cartographic techniques may be used in surveying a historic site:

- a. A topographic map may be obtained from aerial photography taken at low altitude, applying orthographic techniques which eliminate any distortion.
- b. Reverse perspective enables a plan or elevation of certain landscape elements to be drawn from a period photograph, if the dimensions of the element and the approximate position of the camera are known. In this way, it is possible to determine with sufficient accuracy the location of a path, vegetation cluster, fence, building or any other significant object.
- c. Photogrammetric techniques may also be used in surveying a historic site. Stereoscopy enables a landscape to be viewed in three dimensions. In this way, aerial photographs, taken with the camera either perpendicular or at an angle to the ground, easily help the viewer to grasp the composition of a landscape. Vertical shots are preferable for understanding occupancy patterns of persons living on the site. Oblique shots show the context of the site under study and its relationship to the surrounding area to better advantage. Photographs, taken when contrasts between light and shade are heightened, allow for easier interpretation of the landscape.

## 2.7 INVENTORY

An enormous amount of information may be found on the site and on maps and drawings. For this reason, a sample list of items for inventory is included below:

## a. General information:

Enter date, investigator's name, weather, time and so on.

## b. Location

Clearly state the address of the site, including:

- parish, town, village
- county
- province (if necessary)

## c. Property boundaries:

Clearly state the legal property boundaries of the site under study. These will be extremely important in the course of the project. If ambiguities arise, refer to municipal land registers; historical documents may also shed some light on the subject.

## d. Topography:

Clearly show:

- general profile of site with contour lines (an interval of 0.5 m (one to two ft.) between contours is desirable);
- slopes, terraces, hills and valleys, lines of ground movement;
- elevation points of all buildings and structures (these may serve as benchmarks for other elements being sought);
- elevation points of all architectural, enclosure and landscape elements;
- elevation points of certain natural elements (e.g., deciduous and coniferous trees); and
- elevation points of key areas throughout the site.

## e. Built elements:

Buildings and structures should be accurately located on the plan to include:

- |                |                          |
|----------------|--------------------------|
| • houses       | • greenhouses            |
| • outbuildings | • stables                |
| • garages      | • barns                  |
| • boathouses   | • outhouses              |
| • sheds        | • summerhouses or lodges |

Indicate the locations and spot elevations of thresholds, entrances, doors, windows and emergency exits on ground floor and at corners of building. Note any sections added to the building and any apparent major architectural alterations. Note condition of the elements. (If necessary, call on materials preservation specialists for an exact report on state of deterioration of materials.)

Other architectural elements should also be accurately located on the plan:

- |              |            |
|--------------|------------|
| • pergolas   | • bridges  |
| • trellises  | • canals   |
| • gazebos    | • lookouts |
| • tombstones |            |

Show the elevation points and note the condition of these elements. Take photographs and make sketches or drawings as required.

The following landscape components should be accurately located on the plan. Each element should be identified by means of a symbol; the symbols must then be listed and identified in the legend. Take photographs, make sketches and drawings and note materials used. Where applicable, make note of construction methods and current condition.

## a. Enclosing and bordering elements:

- fences (wooden, metal and so on)
- gateways
- boundary markers
- stakes
- retaining walls, enclosure walls

## b. Landscaping elements:

- |              |                   |
|--------------|-------------------|
| • beaches    | • sundials        |
| • fountains  | • urns and vases  |
| • plaques    | • flowerbeds      |
| • lamp posts | • feeding troughs |
| • basins     |                   |

## c. Thoroughfares – pedestrian and vehicular:

- |                |                 |
|----------------|-----------------|
| • stairways    | • lanes         |
| • access ramps | • driveways     |
| • footpaths    | • parking areas |



## d. Utilities:

- gas pipes
- water pipes
- sewer pipes
- septic tanks
- electrical lines and overhead wires
- telephone lines and overhead wires

## e. Archaeological Remains:

- walls (stone, concrete, brick and so on)
- foundations
- milestones

## f. Natural Vegetation:

Show the important areas of this vegetation and specify their use if possible. Enter vegetation species under their common and Latin names. Give a brief description of the colour of flowers, foliage, bark and fruit; note size, quantity and age of these elements.

- |   |                |
|---|----------------|
| • grassed areas                           | • orchards     |
| • grass borders                           | • vineyards    |
| • flowerbeds                              | • fields       |
| • vegetable                               | • meadows      |
| • gardens                                 | • pastures     |
| • heath                                   | • wooded areas |
| • ornamental gardens                      |                |
| • deciduous and coniferous trees          |                |
| • deciduous and coniferous shrubs         |                |
| • flowers – perennials, annuals and bulbs |                |
| • vine and ground cover                   |                |
| • herbaceous and other vegetation         |                |

Note condition of vegetation, such as:

- dead branches
- missing bark
- perforated bark
- weak root system
- disease
- insect attack

## g. Climate factors:

Define the following on local and regional scales and note any important interrelationships.

- average and extreme temperature (°C)
- relative humidity
- prevailing winds
- precipitation (rain and snow)
- rates of sunshine and light
- particular microclimate areas

## h. Drainage:

Accurately locate on the plan all important drainage-related elements and identify each element by means of symbols.

- pits
- marshes
- cesspools
- overall drainage patterns
- low-lying, poorly drained areas



*Kitchen Garden, St. Andrew's Rectory, Selkirk, MN*

## i. Soil:

Define all pedologic elements such as the type, thickness and quality of soil and subsoil. Do laboratory tests as required.

## j. Water:

Give contour elevation points of all water elements. As required, do laboratory tests to determine water quality in:

- swamps
- ponds
- rivers
- lakes
- ground water

## k. Visual analysis:

Make a visual analysis of the site, providing on the plan annotations, views both positive and negative, from within the site to beyond and vice versa, clearly identifying each view on the plan by means of symbols. Take photographs or make sketches.

## l. Personal observation:

Record on the plans, drawings, sketches and any other document, personal observations made on site. Do not pass judgement on the quality or relevance of the remarks at the time they are written down: any observation may later prove useful in developing planning concepts.

Observe the site from different angles, to note all landscaping elements on the site and the overall lie of the land. Reconnoitre the lands adjacent to the site under study. The site may have had much closer connections with neighbouring sites in the past than it has now. Visit the site throughout the year, if possible. Periodic visits could lead to quite different and complementary discoveries.

Observations describing the character of the site are essential in carrying out the project. They are often expressed at the outset as questions and, in most cases, concern the spatial organization of the site. Typical questions are:

- Why is the village in this particular place?
- Why has it taken the shape it has?
- Why did the first inhabitants settle in this spot?
- What are the geographical, geological and human factors that may have influenced the decision?
- Why do the buildings, enclosure elements, roads and open spaces have the configuration they do?
- Is it possible to date the current form of the village and its many elements?

## m. Past evidence:

Historical evidence may help to understand the existing site configuration. Changes that have occurred might be explained by considering these questions:

- What does a rectangular row of houses indicate?
- Why is a church at the distance it is from the site or from the village?
- Why does a road turn at the angle it does near a residential dwelling?
- Do the traffic thoroughfares harmonize with space utilization?
- What is the predominant landscaping style on the site?
- How many landscaping styles are there in all?
- What are the physical relationships between the buildings and vegetation?
- Is there a harmonious blend of vegetation?
- Does all the vegetation date from the same period?
- Does the original design seem to have undergone numerous changes since it was created?
- Do some of the landscaping elements seem incongruous in the setting?
- What can be learned about the colonization and history of development of the site by looking at the buildings and the architectural and landscaping elements?

The information gathered in this phase of the survey and inventory should be easily accessible and understandable to other members of the team. Reports produced in this phase should be filed according to a clear, simple system. A file for each site is highly desirable, each file to include historical documents (text, maps, illustrations) and working documents (inspection cards, plans, sections and elevations, photographs and so on), properly divided.

## 2.8 INVESTIGATIVE TECHNIQUES

There are a number of investigative techniques available to the landscape investigator.

### 2.8.1 *Landscape Archaeology*

Traces of the original garden in a historic site are generally slight and may be obliterated, having gradually deteriorated from the effects of human and natural forces. Some gardens may be uncovered through evidence of paths, walls, foundations of buildings and vegetation. It is possible, however, to clarify and explain certain changes in the landscape by means of landscape archaeology.

Landscape archaeology, practically unknown before the Second World War (Aston and Rowley 1974), is now growing rapidly and attracting increasing numbers of professionals involved in the preservation of cultural property. It is inexpensive, requires minimal equipment and yields surprisingly good results. It differs from traditional archaeology in that no digging is done beneath the surface. It is particularly well suited to landscapes whose elements are not too highly developed and which do not need a traditional archaeological program. Data collected by means of this technique often indicates to the landscape architect locations where an archaeological dig is called for.

Landscape archaeology combines the study of historical documents and visual inspection of the site. It provides clues to former landscape arrangements when backed up with archival research. Thus, only a landscape architect who is a specialist in the study of period landscapes should conduct landscape archaeology. It is essential for accurate observation of the historical property; it provides valuable clues on original land use of the site, forms of occupancy by its inhabitants and the assumed presence of certain landscape elements.

By looking at all the landscape elements, the landscape architect will attempt to answer how and why the landscape under study appears in the form it does. The investigator, through familiarization with existing planning patterns, seeks to discover the irregularities which are part of the landscape.

Existing landscape elements such as vegetation (formal or informal layout, colour, texture and so on) or soil characteristics (e.g. soil composition, profile and drainage patterns) yield important clues to the original design of the site including:

- traffic areas
- vegetation areas (flowerbeds, vegetable gardens, paths and so on)
- recreational areas

Accordingly, the investigator should use the services of other professionals such as geologists (soil identification and soil formation), botanists (identification of plant species), architects (identification of architectural styles) and historians.

The overall operation of landscape archaeology is non-destructive and enables large amounts of information to be gathered quickly.

The process of deduction that characterizes landscape archaeology requires the investigator to visualize the past configuration of a landscape from existing traces on the site. Needless to say, this should take place before any other work is begun which would affect the physical condition of the site (Stewart 1978).

### 2.8.2 *Archaeology*

As a general rule, archaeological digs seek to explain the development of a historic site by establishing the presence of buried artifacts whose location is often undetectable without digging. They are a very useful research tool, because numerous discoveries may be made, sometimes unexpectedly. It is extremely important that the digs be done by archaeologists familiar with the study of landscapes. If not, irremedial damage may be done to the site and much valuable information lost. Ideally, a specialist should be able to collect as much information as possible while digging as little as possible.

Archaeological digs are useful when there is little information on the historical context of the site being inventoried. They are also helpful in confirming the presence on site of elements noted in historical documentary research. The decision on whether to dig should not be made ill-advisedly and should be undertaken only after landscape archaeology has been completed. Archaeological digs can be expensive and time-consuming. All artifacts uncovered should be measured, inventoried, analyzed and recorded. During excavations, photographs of artifacts should also be taken, both perpendicularly and obliquely. Parts and materials (iron, metal, tile, glass and so on) uncovered in the dig may give clues as to date of occupancy and the lifestyle of previous generations; these items should be noted on the base site plan.

Among the items which may be uncovered are:

- a. line of a path, fence, formal planting;
- b. location of a stairway, container, retaining wall;
- c. location of building foundations, ruins;
- d. location of flowerbeds, rock gardens; and
- e. miscellaneous objects such as wires, hardware, wood pieces, tree stumps and bricks.

For each of these, note the exact location, configuration and materials.



*Fort St. James, BC*

### 2.8.3 Aerial Photography

Aerial photographs reveal a great deal about the landscape under study and its relationship to surrounding sites. This type of investigation is relatively new. Many new applications to analyze landscapes remain to be discovered. Aerial views, either stereoscopic or composite, can be used to discern the nature of the soil, drainage patterns and underground geology. Aerial photographs can also show traces of archaeological remains on the soil surface. For instance, a foundation wall will appear as a pale line; a pit, as a dark line.

Infrared aerial photographs, in either black and white or "false" colour, reveal "hidden" features of vegetation. For example, infrared photographs can indicate whether the root system is deep or whether the vegetation suffers from disease or lack of moisture. Photographs taken in July are best for spotting marsh vegetation species.

By means of aerial photography, it is possible to carry out a landscape study which theoretically determines the presence of original landscape elements, such as the line of a fence, location of buildings in a vegetable garden, plantings of trees and shrubs, paths and tracks, complexity of earthworks and layout and direction of cultivated land. The various stages involved can be summarized as follows:

- a. Historical research:  
Familiarization with all historical studies done to date in order to understand the development of the site and learn about the documented physical elements associated with the site.
- b. Photographic research:  
Obtain all existing aerial photographs having satisfactory scale and colour contrast. Order positives of these photographs. Compare aerial photographs with period photographs taken on the ground. Look for the same landscape elements in both. Examine positive films through the density slicer, which allows disrupted zones to appear in a range of different tones and colours. A light tone indicates a high degree of soil disruption and a dark tone, little or no disruption at soil level. Have the new images photographed and kept. Interpret colour photographs with the stereoscope. Look for elements that may have existed previously on site. Map the results obtained on a base plan.



### 2.8.4 *Ecological and Geological Analysis*

Ecological and geological analysis, more scientific than the first three forms of analysis, helps increase knowledge of past conditions on a historic site. Two lesser known types of analysis that concentrate on botanical evidence from the past, that is, determining the original plant species on site are pollen analysis and the study of roots.

#### a. Pollen Analysis:

Palynology or laboratory analysis of the pollen content of the soil is helpful in determining what vegetation existed previously on site and in the surrounding area. It is frequently utilized on prehistoric sites and may also be applied to sites whose history is more recent, although the results will be less accurate than those for older sites.

Pollen can survive for several thousand years after being deposited if no mechanical or chemical process (oxidation) has occurred. Every kind of pollen has a different morphology and varies in size, shape or ornamentation. A number of books illustrating the diversity of pollen may be used to identify pollen gathered on site.

It is impossible to do a pollen analysis on the entire site. Accordingly, the palynologist will collect pollen in the field only at certain specific places, such as inside a vegetable garden, near property lines, near a path, around the outside of a residence or at the bottom of a well (if the well has not been filled in, the pollen found may be of poor quality and contamination will make analysis difficult). Collecting pollen under a water table is also very good. Non-porous materials are more likely than porous materials to contain pollen.

The specialist will take vertical core samples several inches in diameter over several feet of soil and will collect pieces of sediment (sandstone, charcoal) for laboratory analysis. The samples are placed in plastic bags or aluminium foil, clearly identified with date and exact location of extraction and collector's name. The samples collected should, as far as possible, be representative of a period. Surface samples are less valuable, because they contain an accumulation of pollen possibly coming from distant regions and representing too great a number of years. In the lab, the sediments are broken into fragments, mineral substances destroyed by acids, so its only organic

substances (pollen, seeds, leaf residue and so on) are retained. These substances are then placed in a centrifuge and preserved in test tubes. A minimal specimen of the resulting solution is examined under the microscope. It is possible to count the exact number of pollen grains on each microscope slide and to make an overall identification. Black-and-white photographs of the specimens (enlarged several hundred times) are taken (Dimbleby 1976).

The results of pollen analysis are unpredictable. In most cases, it is possible to determine whether the pollen is from a tree, shrub, flower, fern or moss. In some cases, the approximate age of the pollen may also be established. Class, subclass order and family of the vegetation are easily identifiable but genus and species are very difficult to identify.

Conclusions drawn from pollen analysis, however slight, may contribute a great deal when read in correlation with the results of other research (that is, analysis of wood fragments, identification of seeds, wood spores or insects such as beetles).

#### b. Study of Root Systems:

On-site analysis of the root system of a vegetative element can also help identify some of the original vegetation. It applies only to large root systems (those of trees or large shrubs, for example). When trees or shrubs die or are cut down at ground level, their roots disintegrate gradually. If the disintegration is not too far advanced, it may be possible to discover the species of tree or shrub by examining the stump. Roots analysis attempts to identify the remaining imprints in the following manner:

- a. Completely empty ashes and other debris from inside the cavity.
- b. Reinforce the cavity with metal wire.
- c. Fill the cavity with a hardening substance (cement or plaster). Prevent any contact with rain during the hardening period.
- d. Delicately remove the soil around the original casting.
- e. Do comparative research on the imprint and other existing imprints to determine the species of the specimen in question.



## 2.8.5 Laboratory Analysis

Laboratory analysis may determine the age of building materials uncovered in a site investigation (e.g. concrete, wood, stone, mortar, brick and metal parts).

## 2.9 ANALYSIS AND DEDUCTION

On arrival in the field, the investigator already has a certain knowledge of the historic site, is familiar with landscapes of other periods and has made certain predictions about on-site discoveries. There are two general approaches governing the process of deduction and analysis. These are:

- observing and noting existing elements on site; and
- looking for and assessing missing elements which, according to the investigator's expert knowledge, would normally be an integral part of the site.

The investigator's overall professional background and the preparatory studies, will help considerably in assessing information and drawing relevant conclusions concerning the landscape under study. For example, there is a physical link between a residence and an outhouse, between a church and a cemetery and between a public road and a residence. A modest residence will only rarely have an elaborate garden. A pre-1850 residence will have no foundation vegetation.

These observations and the deductions that may be drawn from them are innumerable and are different for each site. However, to illustrate the process of analysis, we have compiled a number of standard situations. The examples are associated directly with the investigative techniques described in 2.8.

**Landscape Architect's  
On-site Observations****Possible  
Deductions**

## a. Vegetation

Aligned planting of trees, shrubs or flowers

Presence of a pedestrian or vehicular thoroughfare (path or driveway)

and/or

Property lines: along the front property line are often found tree species of large size, such as maple (*Acer* sp.) or oak (*Quercus* sp.).

Grouping of lilacs (*Syringa vulgaris*)

An adjacent dwelling: lilacs were often planted near the threshold and around the outside of the residence or around an outhouse.

Grouping of daylily (*Hemerocallis fulva*), periwinkle (*Vinca minor*) and lily-of-the-valley (*Convallaria majalis*)

An adjacent dwelling: daylilies were often planted on the north side of a residence or near the back door, often the kitchen door.

Grouping of hawthorn (*Crataegus crusgalli*), wild cherry (*Prunus virginiana*) and wild grape (*Vitis riparia*)

A fence line or other enclosure element: a demarcation line between fields and pasture.

Mark or incision in the bark of a tree or large shrub

An element was attached to it (for example, fence, clothesline).

Landscape Architect's On-site Observations	Possible Deductions (cont'd)	Landscape Architect's On-site Observations	Possible Deductions (cont'd)
Peonies ( <i>Paenia</i> ), tulips ( <i>Tulipa</i> ), daffodils ( <i>Narcissus</i> ), black spruce ( <i>Picea nigra</i> ), false acacia ( <i>Robinia pseudoacacia</i> ), Lombardy poplar ( <i>Populus nigra Italica</i> ), etc.	Plant species noted for flourishing for a great many years, even after the site has been abandoned; in most cases these were exotic plants at the time and found in the richer areas of the community.	Random grouping of trees and shrubs around clearing	Presence of a vegetable garden (for practical reasons, the garden was often set up near the principal residence and was often enclosed by a fence or a thick hedge); presence of building foundations.
Rhubarb ( <i>Rheum rhaponticum</i> ) and asparagus ( <i>Asparagus officinalis</i> )	Presence and location of a vegetable garden; these are the only two vegetable perennials to flourish for many years on an abandoned site.	Change in colour and texture of the foliage of trees and shrubs	Presence of a garden or vegetable garden, or a path around a garden.
Fruit-bearing shrubs such as raspberry ( <i>Rubus virginiana</i> ) or trees such as apple ( <i>Malus</i> sp.) and peach ( <i>Pyrus</i> sp.)	Presence of a vegetable garden or orchard.	Various shades of lawn colour (more noticeable in oblique view)	Differentiation in quantity of organic matter in the ground. Dark-coloured soil is often rich in organic matter, while light-coloured soil indicates a lack of organic matter.
Definite planting patterns (rectilinear, winding, curved) - formal or informal	A period of occupancy of the property and a particular landscaping style.  An intent to landscape the site by means of regular planting (since plants do not grow this way naturally).	Terraces and slopes	Formal organization of the land.  Presence of buildings and adjacent areas.  Location of access routes to the site and presence of stairways.

<b>Landscape Architect's On-site Observations</b>	<b>Possible Deductions</b>	<b>Landscape Architect's On-site Observations</b>	<b>Possible Deductions</b>
<b>b. Topography and Ground Cover</b>		<b>c. Enclosure and Framing Elements</b>	
Linear depression or an elevation in turf	Presence of a path or road.	Piles of rock and stones	Fence line or property boundary.
Depression on either side of a path	Presence of a flowerbed or plant bed; some form of pit or drainage system.	Piles of poles, old woods and remnants of metal wire	Presence of a fence; delineation of an enclosure.
Slight mound on either side of a path	Presence of a raised plant bed.	Gateway	A path or road.
<b>d. Buildings and Structures</b>		<b>d. Buildings and Structures</b>	
Depression of appreciable size in a well-cleared area	Presence of an ornamental or vegetable garden.  A playing field (for example, croquet, tennis).	Character of the dwelling	Financial status of the inhabitants: a rudimentary house would have a utilitarian garden, that is, a vegetable garden; a more elaborate house would be more likely to have ornamental as well as utilitarian gardens.
Slight depressions at regular intervals	Location of fence posts or structural posts.	Specific architectural style and age of the building	Special construction techniques possibly applied to landscape elements.  A landscaping style matching the period of construction and style of the architecture.
Change in colour or texture of ground cover (or lawn)	Presence of a path or driveway.		
Change in colour or texture of the soil	The amount of manual labour and tilling done on the site.		

These observations and deductions are given by way of example and in no way represent the number of conclusions an investigator could draw from the observations. They do, however, give some indication of the complexity of the assumptions that could be made and of the experience the investigator should have. These examples also emphasize that the most minute observations should be noted and although they may signify nothing at the moment to the investigator, he or she should check with other qualified professionals such as historians, archaeologists, period architects or period engineers to be sure the observations do not have some obscure, but important significance.

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# **VOLUME III**

# **HISTORIC SITE**

# **ANALYSIS**

## **9**

## **ENVIRONMENTAL INVESTIGATION AND ANALYSIS**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
OTTAWA (819) 997-9022

ORIGINAL DRAFT: D. BOUSE



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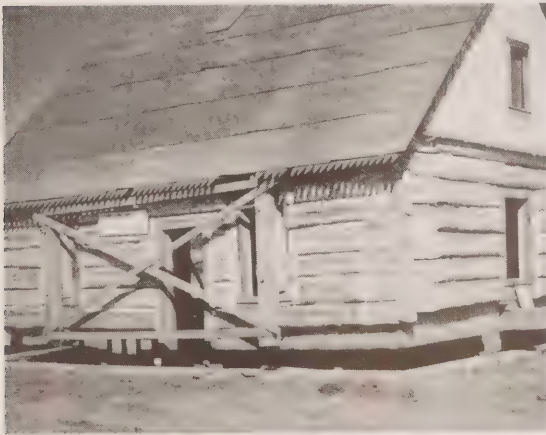
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## 1.0 INTRODUCTION

This article outlines the general objectives and methods of approach for environmental analysis in relation to field investigations of historic sites and structures. It briefly describes many of the environmental concerns affecting the Canadian Park Service's (CPS) heritage resources and how understanding of environmental factors is a prerequisite for heritage resource protection.

Protection for any site or structure, especially a historic one, is not only an important part of development as such, but also an important part of an overall rescue operation. The most important action to be taken is an immediate recognition of the state of the structure and an elimination or reduction of damaging environmental factors. The initial protection has to be done responsibly and be technically correct, because too often the damage is done by improper action resulting in unintended results. These undesirable results can lead to destruction of the historic structure not only in a physical sense, but also in a social and cultural sense.



*Protection of Structure, Fort St. James, BC*

A proper evaluation of the intricate interplay of destructive factors during a rescue operation is of paramount importance. The following guidelines provide technical advice to those engaged in the protection of the CPS heritage resources.

Analysis of historic sites and structures is complicated and difficult to define in simple terms. It is influenced by the numerous internal and external forces affecting the state of individual structures. The magnitude and type of destruction will determine the decision-making and type of action taken to protect a given historic resource. It is important to analyze the resource by assessing its existing condition and by evaluating the possible causes responsible for its condition.

## 2.0 ANALYSIS OBJECTIVES

Every historic structure can be analyzed from various points of view and the analysis itself can be divided into three main categories. For more information, see Section 1 "Categories and Levels of Analysis."

### 2.1 HISTORICAL PERSPECTIVE

The evaluation of a structure from a historical point of view cannot be done in isolation. Its value may depend on its immediate physical surroundings, its relationship with and proximity to other existing structures, its urban or rural environment and also known historical events linked with the structure. The age of the historic structure may not be as important as its socio-environmental interaction.

### 2.2 PHYSICAL PERSPECTIVE

The evaluation of structural and physical problems is the most important and, at the same time, the most complicated process from the point of view of conserving or restoring a given historic structure, containing as it does a variety of materials and elements, a use and occupancy and the evidence of technology. An evaluation of its present state and the degree of existing damage and a specific recommendation for rescue operation are required. To carry out an evaluation of its present condition and specific recommendations for treatment, it is necessary to consider an analysis of all the factors influencing the condition of the structural systems and the surviving fabric and to assess the degree of damage already done.

### 2.3 AESTHETIC PERSPECTIVE

The evaluation of a structure from an artistic point of view is characterized not only by the clarity of its style, its aesthetic and overall architectural quality, but also by consideration of the wider aspects of its interaction with its physical landscape.

## 3.0 CAUSES OF DETERIORATION

The causes of deterioration can be divided into two main groups: intrinsic causes strictly connected to the nature of the building itself and causes derived from external sources (see also Sanpeolesi 1972 [UNESCO]).

Intrinsic causes are both the result of the age and amortization of a given structure in conjunction with existing functions and also the result of indecision and misdirected plans for the building at the time of its original design and later, during its construction. The consequences of these internal contradictions may be the destruction of various structural and aesthetic qualities. Intrinsic causes can be further divided into three sub-groups, taking into account the actual position of the building together with the appearance of various problems resulting from the structural design, implementation of technological processes and the type of materials used:

- geo-topographical orientation
- structural configuration
- faulty materials

### 3.1 INTRINSIC CAUSES

#### 3.1.1 *Geo-topographical Orientation*

The geological composition of different layers of subsoil and the topographical situation of a building are the main determining factors in its actual future positioning in the terrain, as well as its future stability. It relates to the first phase of constructing the building. Without precise knowledge concerning the structural stability of the soil, surface and subsurface water systems, geological faults and the possible existence of various underground pressures, it is indeed often impossible to predict the long-term results of setting up the building. The geo-topographical orientation can also be significantly changed as a result of external factors causing actual damage or otherwise threatening the very structure of the building. It is important, during the

process of evaluation and development of recommendations, to identify and correct these underlying problems before the details of a full restoration plan are worked out. (For instance, surface or subsurface drainage of a foundation or replacement of certain parts of the above-ground structure).

#### 3.1.2 *Structural Configuration and Design Defects*

Environmental analysis must establish the interplay between improper construction methods plus other inherent design defects and the numerous effects from the environment. The original foundations may have been inappropriate for the local conditions; window design may have been inadequate to exclude rainwater; damp coursing may have been omitted; or the ventilation may have been inadequate.

#### 3.1.3 *Defective Materials*

Improper choice of building materials, often involving the acceptance of poor quality, reduces the ability of a structure to resist the various external causes of deterioration and may significantly shorten its lifespan. Not all modern replacement materials and technologies can adequately protect the original artistic or aesthetic value. Every designer must reconcile the old with the new in the light of frequently incomplete information on the inherent defects in the original material and its past behaviour.

### 3.2 EXTERNAL CAUSES

External causes are the main factors contributing to the deterioration of a site or structure. There are various degrees of destructiveness and its intensity may not be visible evenly. External causes fall generally into three categories:

- natural catastrophes
- destruction caused by human activity
- destructive forces responsible for long-term effects

#### 3.2.1 *Natural Catastrophes*

This category embraces all natural factors whose occurrences, although infrequent, may directly affect not only one or more historic buildings, but even much wider areas (for example, earthquakes, floods, hailstorms, wind storms, volcanic eruptions, tidal waves, heavy rains, explosion of underground gases and spontaneous fires). In some cases, scientific technology can predict and even mitigate some of these natural disasters. Of course, full elimination of these causes is impossible.

### 3.2.2 Causes Linked with Human Activity

The most damaging influence on historic structures is human activity, especially at the time of undertaking modifications for new use. This action may result in physical damage, such as cracks in walls, ceilings and support structures or the disruption of overall static stability. Most historic buildings are not easily adapted for modern use because they cannot fulfill all the expectations required without major intervention, involving, for example, new sanitary facilities, heating and air conditioning equipment, new openings in walls and ceilings and electrical and gas distribution facilities. A building structure can also be damaged by various modes of human activity, either by improper use or by an absence of any form of protective action against external sources of damage, such as vandalism. Improper or partial restoration may have catastrophic consequences, with the site losing its intrinsic value or suffering irreparable damage to its structural stability. Sudden and often radical changes in underground geological structures may be caused by the extraction of underground water, deep foundations for new high-rise buildings, construction of subway systems or mining; these may directly affect the stability of the historic structures. A strong concentration of various types of industry, especially heavy industry near a historic site, is another important factor to consider. Such industry may release immense quantities of sulfates and other destructive pollutants.



*Serious Fire Damage*

### 3.2.3 Long-Term Factors

Every historic structure is influenced by numerous factors linked with its geographical position in a landscape, its type of foundation and its climatic conditions. These influences have various constituent parts, including:

- physical components
- chemical and electro-chemical components
- biological components
- microbiological and bacteriological components

Together, these influences cause the aging or weathering process which leads to the eventual loss of the resource. The rate of decay depends on the level of equilibrium between the external environment and the conditions inside the historic structure and within the pores of its materials.

Modern uses often create greater extremes between external and internal environments, thus leading to higher stresses and increased rates of decay. Problems of moisture, for example (see Section 10.3) manifest themselves in a variety of physical, chemical and biological components which may be affected by modifications for contemporary use. Equilibrium in terms of solar radiation, air circulation and pollution may be an existing problem or may be disturbed by inappropriate modifications.

The activities of animals and humans are themselves an environmental influence which must be analyzed and taken into account when recommending measures for conservation. Humans may cause inadvertent destruction because of localized wear after a change in use or wilful destruction through vandalism or exploitation of the resource for short-term gain.

The purpose of environmental analysis is to clearly situate the resource in its larger physical environment, to study the immediate and long-term influences of that environment on the resource and to recommend ways of improving the equilibrium between them.

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# **VOLUME III**

# **HISTORIC SITE**

# **ANALYSIS**

## **10.1**

## **SPECIAL INVESTIGATION AND ANALYSIS**

## **MATERIAL SAMPLES**

PRODUCED BY:  
HERITAGE CONSERVATION PROGRAM  
ARCHITECTURAL AND ENGINEERING SERVICE  
PUBLIC WORKS CANADA FOR ENVIRONMENT CANADA  
OTTAWA (819) 997-9022

ORIGINAL DRAFT: COMMONWEALTH HISTORIC RESOURCE MANAGEMENT LIMITED

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## 4.0 CONCLUSIONS

## 1.0 INTRODUCTION

The purpose of this article is to guide technical and professional staff in taking material samples as part of the analysis process. The text describes the purpose of material sampling, the documentary process required prior to sampling and the procedures involved in taking samples.

It should be read in conjunction with Vol. VI "Conservation of Materials," and Vol. II "Heritage Recording."

### 1.1 PURPOSE OF SAMPLING

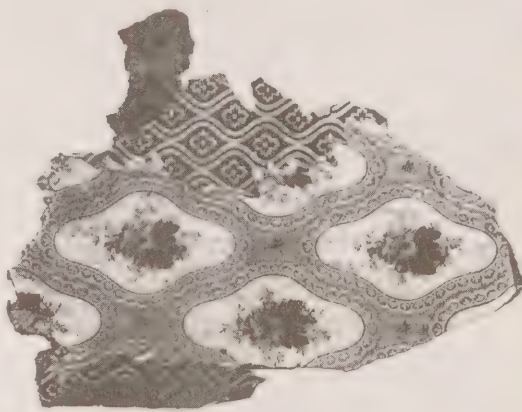
Sampling is usually a prerequisite for conservation work and site development. Subsequent analysis by a conservation laboratory provides documented evidence of the nature of materials, finishes, causes of deterioration, the presence of infestation or decay, characteristics of structures and assemblies and the nature of patterns or designs. A preliminary assessment of samples can contribute to planning proposals and order-of-magnitude capital cost estimates. Samples can also be used to develop specifications for reproductions or the reconstruction of missing components.

### 1.2 GENERAL PROCEDURES

Sampling should be done in a manner that causes minimal intervention to the historic fabric. Samples should be taken in a manner and from a location that will not damage the building aesthetically or structurally. While materials sampling is not a non-destructive testing technique, with care it should cause little destruction.

The following procedures for removing samples are common to all materials and techniques:

- a. Obtain drawings showing plans and elevations.
- b. Devise a numbering system that will clearly show the relationship between the sample and its original location. The system should be consistent throughout the historic site.
- c. Photograph sample in place. The specific conditions will determine the type of photography which should be used. Details of location should be noted for each sample.
- d. Assess the condition of the sample and take whatever precautions are necessary to protect the sample, the surrounding material and the sampler.
- e. Remove the sample. (Specific techniques are described below)
- f. Label the sample.
- g. Prepare sample for storage with appropriate protective packaging and documentation.
- h. Submit the sample to the conservation or testing laboratory.



*Mid-19th century Wallpaper Samples, Dodderidge House, Charlottetown, PE*

Photo courtesy PEI Heritage Foundation

## 2.0 PREPARATION FOR TAKING SAMPLES

### 2.1 TERMS OF REFERENCE

Review the objectives and restrictions of the specific sampling task. The process should serve the ends of the historic site project by providing needed information. In collaboration with other specialists, decide who should take the samples. Define and describe the exact nature of the work to be done, the limits of the survey and the desired format for reporting findings.

### 2.2 BACKGROUND DOCUMENTATION AND INFORMATION

Documentation relevant to the taking of samples should be collected prior to removal. Such information may have been obtained during an environmental, architectural or engineering analysis. The specialists engaged in these analyses should be

consulted. When structural material is to be removed, an engineer should advise of the effect on the load-bearing capacity before any sample is taken.

## 2.3 EQUIPMENT

Establish who will provide the required equipment. The sampler should become thoroughly familiar with the equipment and should test it on comparable material. Field notes may be kept in a loose-leaf binder. Tags, sample bags and containers should be identified with permanent markers or markings.

Note required safety equipment for the protection of the sampler, such as masks and respirators. (Health and safety are considered in Vol. I.5.)

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## 3.0 MATERIALS

### 3.1 WOOD

#### 3.1.1 Visual Inspection

Before taking samples, note:

- a. the colour of the wood (discolouration may indicate high moisture content);
- b. the presence of any fruiting bodies which may indicate moderate to excessive decay;
- c. depression in the surface (over pockets of decay);
- d. water stains;
- e. rust from corroded fixings;
- f. moss; and
- g. evidence of insect infestation.

#### 3.1.2 Tests

Joists or beams to be sampled may be tapped with a rubber mallet. A sharp ring indicates sound wood; a dull thud, decay.

With either a brace and bit or an electric drill, bore a small hole in an inconspicuous spot. Reduced resistance indicates rot.

Sample the moisture content of wood with a calibrated moisture meter. It is necessary to know the species of the wood to obtain accurate data. A moisture content over 20 percent will usually support fungal outbreak. The accuracy of moisture meters is affected by wood preservatives which can give a misleading reading.

#### 3.1.3 Removal Techniques

- a. Coring:  
With an incremental borer or a plug-cutter, core out a section at a downward slope of 45°. The core can be tested for decay or preservative penetration, measured for shell thickness or cultured for fungi.
- b. Ultrasound:  
This is a non-destructive testing tool used to verify coring results.
- c. Scrapers:  
A triangular scraper or dull probe used below grade will collect any surface rot.
- d. Pick test:  
With a sharp probe, lift a wood sample. A long splintering break indicates sound wood; a brash break reveals decay.

### 3.2 MASONRY

#### 3.2.1 Removal Techniques

Gently pry loose any spalling or loose flakes of brick, stone or terra cotta. These fragments may provide adequate samples, depending on the purpose of the intervention. If cores are required, use a carbide-tipped bit in a hammer drill to cut a plug. Dislodge the plug with a cold chisel and a 2-kg. maul. Wear safety goggles.

### 3.3 METALS

#### 3.3.1 Visual Inspection

As far as possible, in situ techniques should be used to identify the original composition and subsequent corrosion of pure metals and alloys and of their various coatings. A metal file should be used in an inconspicuous location to make an initial determination, based on colour, brightness, hardness and density.

#### 3.3.2 Removal Techniques

For sheet metals, cut out both corroded and non-corroded samples from inconspicuous locations. On exterior surfaces, be sure that the water-shedding characteristics of the surrounding area are not affected. These samples can be used in the laboratory to study the composition and properties of both the base metal and the various coatings and finishes.

For larger cast, wrought or rolled sections, either cut out a small sample from an inconspicuous and structurally insignificant location or locate an element that can be unbolted or detached

for removal to a laboratory. Certain tests can be carried out non-destructively, allowing the element to then be returned to its original location.

### 3.4 WALLPAPER

#### 3.4.1 Areas to Sample

In order to document the wallpaper in a room thoroughly, samples should be taken from around doors, windows, mantles, chair rails, baseboards, friezes and in the centre, corners and borders of ceilings. Try to get samples which have not been discoloured by sunlight or stains.



Wallpaper Sample

#### 3.4.2 Removal Techniques

Using a wide spatula or a palette knife, gently pry under the surface of the paper to remove large pieces from the substrate.

If the old glue has not dried and separated, it may be necessary to use a steamer to remove samples. The object is to wet the glue, not the paper. A small domestic clothes steamer will direct steam under the wallpaper. This is not as effective on a

horizontal surface as on a vertical one, since the steam may condense and soak the wallpaper. Two people are more effective in steaming paper than one: one person to pry the paper with a spatula, the other to support the paper with a polyester net. Multiple layers which are sandwiched together should be separated in the lab, not on the site.

If non-water-soluble glues were used to fix the wallpaper to the wall, test appropriate solvents with a cotton swab.

#### 3.4.3 Precautions

Pigments may be chemically unstable or water soluble. Do not wet the paper excessively. To prevent the growth of moulds, dry before shipment to the laboratory. Never use towelling or newspapers which can stick to the wallpaper or transfer their dyes. Waxed paper or polyester webbing is more suitable for supporting and packaging the wallpaper.

### 3.5 PLASTER

Occasionally it becomes necessary to remove moulded plasterwork in order to preserve it during the restoration of a building, to repair it or to cast a reproduction.

#### 3.5.1 Removal Techniques

Support the plaster with an appropriate thickness of foam reinforced with 5 cm plywood and 45 cm x 95 cm bracing. Delicately moulded plasterwork should be removed with its plaster backing. Gently cut around the moulded piece with a saw or sharp knife. To break the keys, slowly pry the assembly away from the lath with a broad putty knife. The moulded piece can subsequently be separated from its substrate in the lab. Sound plaster can be separated from the substrate by tapping tangentially into the slip coat with a thick knife.

## 4.0 CONCLUSIONS

After the samples have been taken, they are sent to the conservation lab. Any additional areas appropriate for investigation should be noted, as should the need for short-term and long-term intervention to protect the materials and finishes from which samples have been taken.

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**VOLUME III**  
**HISTORIC SITE**  
**ANALYSIS**

**10.2**  
**SPECIAL INVESTIGATION AND ANALYSIS**  
**COLOUR**

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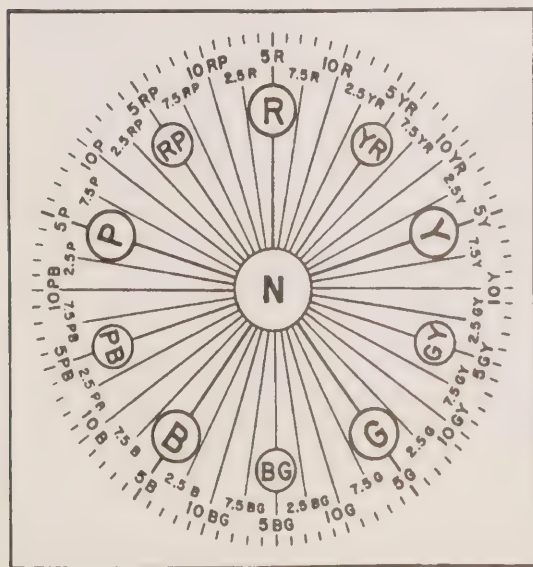
## 9.0 BIBLIOGRAPHY

## 1.0 INTRODUCTION

The analysis of heritage resources frequently includes the identification of colour schemes for historical evolution studies or period restoration specifications. In practice, colour analysis is dependent on several factors, including the observers' perception, the expected degree (or level) of precision and the condition of each sample.

This article provides an introduction to: colour analysis; the various colour systems, nomenclature and standards; the different methods of identifying colour; and the levels of precision which might be applicable to various projects. It is intended for professional and technical personnel who direct or conduct analytical investigations of historic structures and sites.

Colour analysis for the restoration of historic structures and sites goes beyond simple visual colour identification. Analytical methods and colour standards commonly used by research and industry are available to conservation specialists for observing, designating and duplicating period colours. Colour identification can be applied to paint and finishes, building stones, plant material, wallpaper, textiles, wood and metals. Systematic colour sampling and identification provides a reliable base for documenting and reproducing historic colours.



*Munsell Color System: Hues*

## 1.1 DEFINITIONS

The following definitions are used in this article. Many of these terms can have more precise or more general meanings and also may vary in meaning between professions.

### a. Colour:

The visually perceived properties of light which are usually specified in terms of hue, saturation and lightness. In physics, colour is radiant energy or the property of (reflected) light of particular wavelengths. In psychophysics, colour can be considered as the response of the normal eye to the differences in the radiant energy. According to the Optical Society of America, psychophysical properties of colour can be specified by chromaticity coordinates and luminous reflectance, while psychological properties of colour are usually specified by hue, saturation and lightness.

### b. Chromaticity co-ordinates:

The ratio of tristimulus values (reference stimuli) of the colour to their sum. These co-ordinates are usually combined with the percent or ratio of reflected light (luminous reflectance) when specifying colour. This system is recommended by the Commission Internationale de l'Eclairage (CIE).

### c. Hue:

The attribute used to denote chromatic qualities (without black or white), such as violet, blue, green, yellow or red, as visualized in the colour spectrum. On the colour solid, a hue designation refers to the cyclical or longitudinal measurement, with the saturated (pure) chromatic colours on the equator.

### d. Lightness ("value" in the Munsell system):

The attribute used to denote achromatic qualities (black to white) or the amount of reflected light. On the colour solid, a lightness designation refers to the vertical latitude measurement with one pole being white and the other black.

### e. Saturation ("chroma" in the Munsell system):

The attribute used to denote the pureness or degree of difference from the achromatic colour most resembling it to the pure chromatic colour. On the colour solid, the saturation designation refers to the distance from the white-grey-black axis (neutral) in a radial direction.

## f. Fugitive:

The property of some pigments or colorants to shift significantly or fade from their original, intended appearance. While all dyes and paints will shift or fade somewhat over time, fugitive colours are those noted for their instability. Strong blues, yellows and greens are likely to contain fugitive colorants.

## g. Colour Solid:

A physical or theoretical model representing the relationship of perceived colours using a three-dimensional concept. Physical (full-colour) diagrammatic models can be established using colour systems, such as Ostwald or Munsell, while the CIE colour solid can only be expressed mathematically.

## h. Colour Standard:

A physical sample (or collection of sample chips, for example) used for making visual comparisons with miscellaneous materials (such as period specimens). The specifications for a colour standard should be known or obtainable; e.g. using CIE chromaticity co-ordinates and luminous reflectance.

## 2.0 UNIVERSAL COLOUR SYSTEMS

Colorimetry is now standardized to involve objective and physical measurements exclusively. In 1931 and 1964, the CIE recommended standard colorimetric systems using tristimulus values of dominant or complementary wave length, purity and the luminance factor. The most common method of designating colour uses chromaticity co-ordinates (and luminous reflectance) which are values derived from the tristimulus values. These high-precision values are normally determined by instrumental measurements using a spectrophotometer.

The designations recommended by the CIE are useful for scientific purposes, but without tangible (visual) standards, are not suitable for normal colour identification work. The two most common colour theories based on tangible standards (or samples) which can be used for visual matching are Munsell (the most widely used North American system) and Ostwald.

Both of these systems were evolved from theories of colour developed from the 17th century until the late 19th century, especially by Isaac Newton and J. Clark Maxwell.

## 2.1 MAXWELL

Perhaps the most noteworthy 19th-century system for colour designation was that proposed by the physicist, J. Clark Maxwell. His system (evolved from Isaac Newton and others) was based on three aspects: hue, shade and tint. The Maxwell method of identification suggested that the addition of white (or light grey) colorants to a specific hue would produce the "tint" aspect; the addition of black (or dark grey) colorants, the "shade" aspect. This theory of colour is the basis for the colour-mixture concepts of colour relationships, such as the Ostwald System or the Color Harmony Manual. (Sample colours are not commercially available for the Maxwell system.)

## 2.2 OSTWALD

The first Ostwald colour atlas, published in 1917, contained over 2500 sample colours. Wilhelm Ostwald, a Nobel chemist with an interest in painting, evolved a comprehensive colour-mixture theory more developed than that proposed by Maxwell. Ostwald's sample colours were arranged in triangular patterns which could be related to the concept of a colour wheel containing the saturated hues at its edge with a neutral grey centre. Above and below this wheel are cones with one point black and the other white. This concept of the colour solid provides a simple method for identifying a specific colour by comparing a given sample or specimen with the published standard colours.

## 2.3 MUNSELL

By contrast, the system of colour notation developed by the 19th-century artist, Albert H. Munsell, is based on a colour-appearance theory (the perceived colour) which can be illustrated by an irregular solid. In the Munsell system, first published in 1915, the concepts of lightness and saturation are referred to as value and chroma. The vertical pole of the solid represents the value scale, with white at the top and black at the bottom. Chroma scales run horizontally out from the vertical pole. Since chroma varies from hue to hue, the chroma scales are of different lengths. This system has been vigorously marketed as a universal standard and has become the standard for most visual North American matching. The current Munsell books and atlases include approximately 1500 sample colours, distributed by Munsell Color, Baltimore, MD.



## 2.4 OTHER SYSTEMS

Other universal colour systems, such as Ridgeway or Plochere also have special applications. Colour standards, which are sometimes based on universal systems, are discussed in 4.0.

## 3.0 LEVELS OF COLOUR IDENTIFICATION

While “yellow” or “reddish brown” may be adequate descriptions of a specific colour in some instances, more precise methods of identification are often required. The Universal Color Language (Kelly and Judd 1976) sets out six correlated levels of precision (or fineness) for identifying different colours. These six levels provide a useful basis for the different requirements for colour identification.

The following six levels are modified from the concept of colour designation levels as described by the U.S. National Bureau of Standards (NBS) and the Inter-Society Colour Council (ISCC).

- a. Level 1:  
The first level of precision includes the basic hue names and neutrals. It divides the colour solid into approximately ten divisions: red, orange, yellow, green, blue, purple, white, grey and black. Brown and olive are sometimes included.
- b. Level 2:  
The second level contains the basic hue names, intermediate hues, basic lighter and darker colours and the neutrals. In total there are about 30 divisions to the colour solid for Level 2. “Reddish brown” is an example.
- c. Level 3:  
The third level contains about 300 divisions to the colour solid. It includes all hue names, neutrals and modifiers, e.g. “dark greyish reddish brown.” The Level 3 designation can be defined as the classification system used by the ISCC/NBS (Kelly and Judd 1976). The Canadian General Standards Board (CGSB) Standard Paint Colors might also be considered as a Level 3 designation. This level of fineness is suited for various industrial applications as well as photogrammetry.
- d. Level 4:  
The fourth level is related to the detailed systems and standards which use large catalogues of colour samples. In

general, Level 4 is described as dividing the colour solid into 1000 to 10 000 units. Munsell includes approximately 1500 divisions; the original Ostwald, 2500; Ridgeway, over 1100; and Plochere, over 1200. The Maerz and Paul dictionary and the Villalobos system are the largest Level 4 systems, containing over 7000 samples. Major paint companies also produce extensive colour standards which can occasionally achieve the precision of Level 4. (See Table 2 in the Appendix.)

- e. Level 5:  
This level of colour identification can only be performed by instrumentation or visual matching (with interpolation, extrapolation or descriptive qualifiers) under ideal conditions. This level of fineness is generally considered to contain approximately 100 000 divisions to the colour solid. The recommended procedure for visual evaluation of colour to this level is described in 5.2.
- f. Level 6:  
The greatest meaningful accuracy of colour identification using a spectrophotometer expressed in chromatic coordinates and luminous reflectance is considered to be Level 6. This degree of fineness includes approximately five million divisions.

## 4.0 COLOUR STANDARDS

In contrast to the two most popular colour theories (Munsell and Ostwald) using standard sample colours, various colour standards have been developed for scientific, commercial, industrial or other regulatory needs. Occasionally these standards are based on colour samples from a universal system, such as Munsell. In other cases they are simply popular examples of colours suitable for designated applications, such as the CGSB *Standard Paint Colors*.

### 4.1 NON-COMMERCIAL STANDARDS

Table 1 (see Appendix) contains the names of many common colour standards and typical application. They can be used separately or in combination to provide an alternative method of achieving a Level 4 designation when the Munsell samples are not available. (Some of these standards are limited (e.g. soils) and would not be suitable for general application at Level 4 precision.)

## 4.2 COMMERCIAL STANDARDS

The most readily accessible colour standards for field application are the numerous fan decks (colour fans) and sample books (or boxes) produced by paint manufacturers. Each major company issues a wide range of popular colours, often with about 1000 different samples.

While these commercial standards are usually less comprehensive and controlled than most of the general-purpose colour standards in Table 1, they may be considered as elementary colour atlases. They may also be suitable for cursory or preliminary analysis because of the following considerations:

- a. economy – fan decks, sample chips and sample books are available free or at a nominal cost to architects and other professionals;
- b. visual representation – sample chips and books provide a convenient source for including visual examples of the extant colour or the replica period colour within a report or specification;
- c. ease of field use – fan decks provide the most convenient portable system for on-site colour identification to Level 3 (and possibly Level 4); and
- d. flexibility – commercial standards (sample chips) can be matched to Munsell notations at a later date; also, some commercial reference codes or colour names can be cross-referenced with CIE or Munsell notations.

Table 2 contains a few of the standards used by several larger commercial paint companies in Canada.

## 5.0 COLOUR ANALYSIS PROCEDURES

Colour analysis includes sampling, examination and identification, with colour identification as the central objective. Attributes which affect the perceived colour, but are not usually covered in simple identification methods, include:

- a. Metallic characteristics:  
Designations for shiny materials, such as brass or tin are not used within conventional colour systems.
- b. Fluorescent properties:  
The colour of the fluorescence of an object is difficult to measure without special procedures.
- c. Cloudy or transparent components:  
Non-opaque materials require special viewing conditions.

- d. Degree of gloss or matte:

A glossy surface will often appear to be lighter than a matte surface of the same actual colour.

- e. Composite versus homogeneous colorants:

Period paints may appear more “alive” than modern substitutes because the pigments were often more coarsely ground and consequently reacted somewhat like a kaleidoscope of colours achieving an overall single tone. Finely ground pigments appear flatter or duller because of the apparent homogeneous pigmentation.

- f. Shape and Texture:

Textured surfaces, embossing and curved objects are affected by illumination difficulties. Heavier textures appear darker than fine textures.

These attributes affect the appearance of an object as well as the colour perception.

## 5.1 CURSORY VISUAL IDENTIFICATION

For visual colour matching, samples should be viewed in consistent lighting. Colour samples from a known standard are not essential at Levels 1 or 2. Paint-layer analysis in support of structural histories is one application of this type of cursory identification. “Green over black over white over white over reddish brown” would be sufficient for most preliminary paint-layer analysis.

Visual matching to Level 3 should be done with samples from one of the colour standards discussed in 4.0 or one of the colour systems described in 2.0. Paint company colour standards or CGSB standards provide the most readily accessible basis for a Level 3 identification. Ridgeway and Munsell samples, as well as other large collections, could also be used for a Level 3 identification. Special procedures would not be necessary.

Period colour schemes can be specified to Level 3 in cases where high precision is not mandatory. It is also possible to combine Level 3 colour identification with more precisely selected colour samples (e.g. from an assortment of paint company standards) to attach to analysis reports, specifications for colour schemes and so on (see 7.2). Treasury Board regulations discourage the specification of individual colour designations as used by manufacturers, but do not discourage the use of samples (paint chips).

## 5.2 PRECISE VISUAL IDENTIFICATION

When more precision is required, it is desirable to use a universal set of standards.

For visual colour matching to Levels 4 and 5, the period colour samples should ideally be no less than the size of the standard colour chip used for comparison (20 mm x 20 mm or larger). Several procedures are outlined in 5.2.1.2 for Level 5, one modified from ASTM Standard D1535, "Specifying Color by the Munsell System" and an alternative procedure is based on CGSB 1-GP-71, Test Method 12.9.

### 5.2.1 ASTM Standard D1535

#### a. Lighting and Viewing Conditions:

Place the specimen on a neutral background (middle grey to white) and illuminate it with natural daylight or artificial daylight equipment. The specimen should be viewed by an observer with normal colour vision. Select a window in which the sun is not shining. (A north window is usually preferred.) Place a table by the window so that light reaches the table top from the observer's side, chiefly from the sky and at angles centering on 45° from the horizontal. Place a canopy of black cloth above the working surface to prevent errors caused by reflections of light from the ceiling or room objects in the surface of the specimen. View the specimen along a direction just far enough from the perpendicular to avoid reflection of the observer's forehead. Although 45° illumination and perpendicular viewing are recommended by the CIE, converse conditions will give results equivalent to the recommended method if a black cloth is hung opposite the observer.

#### b. Procedure:

If both matte and glossy editions of the Munsell books of colour are available, use the edition the gloss of which is closer to that of the specimen. Select the two adjacent Munsell constant-hue charts or standards between which the hue of the specimen lies. Place one on each side of the specimen. Cover the specimen and the standards with the gray masks so that the specimen and one chip from each standard can be seen. Move masks from chip to chip in order to find the chips most closely matching the specimen. The glossy finish collection has removable chips. When using this edition, the appropriate chips should be removed and placed immediately adjacent to the specimen. Estimate, in order, the value (lightness), chroma (saturation)

and hue by interpolation or extrapolation of the chip designations as described below. Interchange positions of the standards, repeat the estimations and average the results.

#### c. Value (Lightness):

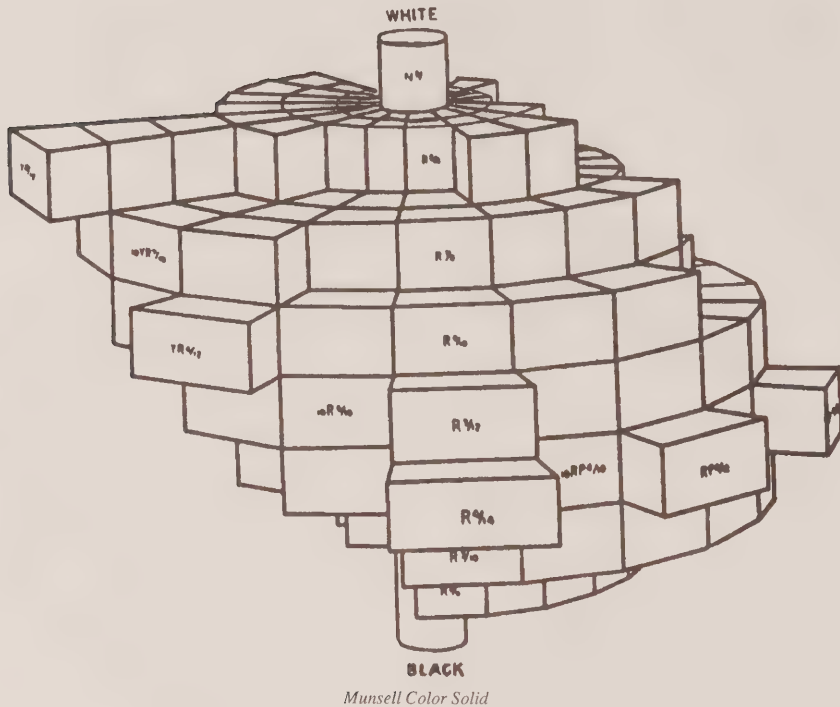
Find the chips between which the value of the specimen lies. Estimate the value of the specimen to the nearest tenth of the one-value-step interval between adjacent value levels. Record the estimated value.

#### d. Chroma (Saturation):

Move the masks so as to present successive chips of the same Munsell hue and value but of different chroma and, by interpolation or extrapolation, determine the Munsell chroma of the colour. Pay most attention to the Munsell chips having values nearest that of the specimen and secondary attention to those next nearest. Although all Munsell chips of the same chroma notation are intended to yield colour perceptions having the same saturation, a slightly different estimate of chroma may be obtained by comparison with the chips of the next value. In such a case, average the estimated chromas. Note that there are usually two chroma steps between adjacent columns of chips. Estimate the chroma to the nearest fifth of the 2-chroma interval and record the estimated chroma after the value estimate with a slash between (e.g. 4.2/6.4 indicates a value of 4.2 and a chroma of 6.4).

#### e. Hue:

Estimate the hue of the specimen by interpolation between the chips of the nearest Munsell value and chroma in the selected hue charts. Estimate to the nearest fifth of the 2.5-hue steps between adjacent hue charts. Record the hue estimate in front of the value-chroma estimate and separated from it by a space (e.g. 0.5 YR 4.2/6.4). If the value and chroma of the specimen do not correspond closely to those of any chip, repeat the interpolation of hue with the next closest pair of chips and record the average.





This method can be used with any of the standards listed in Tables 1 and 2; it can also be used to describe the visual differences between a precisely identified colour and a less-than-perfect match for a reproduction of that colour.

Always report the methods of colour matching used by the observer, such as lighting and optical aids; the colour standards utilized for the identification; and an adequate description of the historic resource, locations of specimen samples and other data concerning the specimens. Attach an example of the colour chips, when possible.

### 5.3 INSTRUMENTAL MEASUREMENT OF COLOUR

If maximum precision is required, the colour can be measured using a spectrophotometer.

This instrument, with a reflectance attachment, eliminates the subjectivity of light variations and human perception of colour. The analysis involves taking readings of the light reflectance of the samples at various wavelengths spanning the visible spectrum. Exact chromaticity coordinates are calculated based on the characteristics of the resultant spectral curve (Perrault 1978).

The Conservation Division, National Historic Sites Directorate, Canadian Parks Service, has a spectrophotometer and can perform this type of analysis. Minimum sample size should be approximately 25 mm x 25 mm.

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## 6.0 FACTORS AFFECTING COLOUR STABILITY

For organic and geological material, colour is an inherent property. For manufactured, composite materials, such as metals, plastics and coatings (e.g. paint), the resultant colour can be controlled with the use of dyes and colorants. In either case, the 'historic' colour can be affected over time by the following:

- a. Exposure to ultraviolet light (sunlight), causing fading and bleaching: if this is a problem, efforts should be made to ensure sampling is done in an area least affected.
- b. Exposure to heat source.
- c. Exposure to environmental pollutants which chemically react with the surface: for example, white lead in

paint, when exposed to sulfurous products, darkens irreversibly. Depending on the problem, some chemical treatments may reverse the process.

- d. Change of conditions: for example, colour identification of flowers should be made before samples are taken, since colours appear to deepen upon drying. Also, altering light conditions affects colour; e.g. linseed oil, an oil paint medium, yellows in darkness.
- e. Aging: paints may, through time, appear to lose their medium content. To make the pigments optically refract the light correctly, the surface can be treated with a thin layer of acryloid.
- f. Chemical stability of components: for example, certain pigments, such as Prussian blue or verdigris green used in historic paints change over time, losing their covering power and are termed 'fugitive colours.'

### 6.1 FUGITIVE COLOURS

The most unpredictable single source of discolouration is the unstable pigmentation used in some period dyes, inks and paints. Chemical analysis of original pigments is necessary to establish, with certainty, the likelihood of discolouration caused by fugitive pigments.

Fugitive colours become a factor when conducting paint-layer analysis if there were substantial differences in the amounts of light (or heat and so on) which were allowed to strike the paint at the different locations from which the specimen samples were taken. (Additional discussion of this problem and recommended sample-taking procedures are contained in Vol. VI.7.3 "Paint Analysis.")

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## 7.0 COLOUR IDENTIFICATION FOR PERIOD COLOUR SCHEMES

Proper colour analysis and identification is essential to understanding heritage resources and developing accurate period restorations. Although colour is only part of the reproduction process for historical finishes, it is probably the most controversial. Discrepancies can occur because of incomplete sampling, colour shift, perceptual shortcomings, improper view conditions, vague specification or poor quality control.



Successful colour analysis requires knowledgeable staff conducting the physical investigation process with contributions by colour specialists, specialized historians and experienced conservation scientists.

For most colour analysis requirements for restoration projects, reference to a well-known colour standard is recommended for the following reasons:

- a. it permits comparisons, if appropriate lighting conditions can be achieved;
- b. it gives the user a visual appreciation of overall colour scheme;
- c. it is simple, requiring no special skills or equipment other than a book of standard colours; and
- d. it permits recording of colour in universally known, easily referenced systems.

Munsell is the preferred method of notation for visually matched colours. The CIE system is preferred for instrument identification and system correlation. Other standards are allowable if accompanied by visual samples or Level 3 precision is sufficient for the intended purpose.

### 7.1 WRITTEN NOTATION OF EXTANT COLOURS

For the project dossier, colour analysis should include written notation to a minimum of Level 2. Level 3 notation should be considered mandatory for all important period colours studied. In special circumstances, such as the Confederation Chamber historical colour scheme, Province House, Charlottetown, PEI, Level 5 would be appropriate.

Munsell notations should be used for all colour analysis where Levels 4 or 5 are specified. Munsell notations are also recommended when it is desirable to record precisely either the conjectural period appearance of colours, the colours intended in a specification or the actual colours applied in a period replica colour scheme. While the use of CGSB standards, paint company colour numbers or names and conventional Level 3 notations would be suitable in some instances, there are many special situations where Levels 4 and 5 Munsell notation would be desirable for archival purposes.

### 7.2 VISUAL REPLICATION OF EXTANT COLOURS

For design purposes, work specifications or archival records it is frequently necessary to include reference to a specific visual standard (or, as in some cases, the preparation of a visual record).

Colour analysis can include the preparation of colour schedules using preprinted chips, such as those sold by the Munsell Company or the larger commercial paint manufacturers; specially printed chips, including photographic prints prepared under controlled conditions; and specially mixed colours, using stable pigmented water colours or the actual dye or paint applied in the period replica scheme. While these methods have many obvious advantages over written notations, a written notation should also be undertaken for each situation.

Whenever visual colour schedules using replica colours are prepared for colour analysis, they should be considered as original records for retention and disposal according to the discussion in Vol. I.3 "Information Management."

### 7.3 NOTATION OF CONJECTURAL PERIOD COLOURS

All methods of estimating actual period colour schemes are imprecise to a greater or lesser degree, depending on those factors described in 6.0. Consequently, specification of period schemes is, at best, no more precise than Level 4 and often no more accurate than Level 3.

It follows that there is seldom a need to record written notations for conjectural original colours more accurately than Level 4 using the Munsell system. Occasionally, CGSB standards may be suitable.

Visual schedules of a conjectural colour scheme are often more valuable than written notations, especially when they are based on period formulas for the dye or paint. Visual schedules may also include material samples (of unweathered building stone, for example) for purposes of work specifications or archival reference.

In all cases where conjectural period colours are noted (written or visual notation), full documentation should be attached explaining the identification procedures, actual observed colours and particulars concerning the analysis.

#### 7.4 ALTERNATIVE METHODS

In situations requiring verification of a fugitive colour or where there is no surviving material, the study of historical descriptions may prove helpful for colour identification, e.g. a reference to “Spanish brown” in historical records gives a clue to the actual period colour.

Colour dictionaries and historical studies give the range of hues, saturations and values (lightness) previously associated with the specified colour name. “Spanish brown” began as an inexpensive earth pigment (clay with considerable iron oxide content). While the pigment name was later applied to various reddish-brown clays from non-Spanish sources, the name also became synonymous with a colour, usually reddish-brown. The range of period descriptions includes “dark, dull red of a Horseflesh Colour” (attributed to John Smith, “The Art of Painting of Oyl,” ca. 1700, Candee); “dirty brown” (attributed to Dürer, 1660, *Oxford English Dictionary*); or “dark reddish orange” (ISCC-NBS designation for colour standard 6L12 from Mäerz & Paul, 1930). This is a good indication of the range of tones (as a colour or as a pigment) which may have been called “Spanish brown.”

#### 7.5 TOLERANCES

Specifying period colours in contracts is complicated by the procedures used for contemporary products which are weighted in favour of large orders or large tolerances, neither of which are suitable for most period restoration work. (Hum-Hartley 1980.) When identifying period colours for restoration or maintenance, it is important to indicate (and be aware of) the acceptable degree of tolerance.

#### 7.6 LEVELS OF ANALYSIS

As described in Section 1 “Categories and Levels of Analysis,” there are four levels of thoroughness established for physical investigations of historic buildings, works and lands. They are:

- a. Level “A”, an exhaustive analysis;
- b. Level “B”, a comprehensive general analysis;
- c. Level “C”, a partial analysis; and
- d. Level “D”, a cursory analysis.

These levels of analysis can be related to the six levels of precision for colour identification based on the ISCC-NBS Universal Color Language. Levels 1 and 2 would be compatible with a cursory analysis, while Level 3 would be suitable for most partial analysis (Level “C”). Level “B” analysis would normally require a more thorough identification of colours with the most historically important extant colours identified to a Level 4 precision. Level “A” analysis suggests a rigorous study of pigments, binders, papers, colour shift and precise identification of extant colours to Level 5 or 6. This high level of colour analysis is usually carried out by specialists.

Munsell notations or CIE co-ordinates should be used for Level “A” analysis. Munsell notations should also be used for the historically important colours identified as part of a Level “B” analysis. (These colours might be the original scheme or the scheme selected for period restoration.) If access to the Munsell colour standards is not feasible for a Level “B” analysis, it is important to use a well-known standard and to include sample chips or other visual (actual colour) notation.

#### 7.7 DOCUMENTATION

It should be remembered that analysis for establishing precise period colour schemes is somewhat subjective but may be necessary.

To that end, it is essential to provide adequate description and documentation of the analysis methods used, the extant colours observed and the rationale for selecting conjectural period colours. This, combined with historical records and other research, will provide the basis for protecting, understanding and explaining each heritage resource.

## 8.0 APPENDIX

TABLE 1

Colour Standards*	(Approx. no. of samples in collection)	Application
British Colour Index	(n/a)	Textiles, dyes
Canadian Government Specification Board 1-GP-12C- Standard Paint Colours	(400)	Paint for public buildings (gloss, semi-gloss, and matte)
Centroid Color chart and ISCC-NB5 colour name charts	(19)	Pharmacopeia and general reference
Color Harmony Manual (based on Ostwald System)	(950)	Commercial products
Dade (based on Ridgeway System)	(n/a)	Biology
Maerz and Paul Dictionary of Color	(7050)	Definitions for historical colour names with examples
DIN – Color chart	(n/a)	Colour specification in Germany
Rock Color Chart (based on Munsell)	(n/a)	Geology, building stones
Nickerson Color Standards (based on Munsell)	(n/a)	Flowers, soils, ceramics
Plochere Color System	(1250)	Interior decorating (samples are relatively inexpensive)
Ridgeway Color Standards and Color Nomenclature	(1115)	Natural sciences (ornithology, geology, botany, biology)
Royal Horticultural Society Horticultural Colour Chart (Wilson)	(200)	Flowers Plant material
Standard Color Card of America	(216)	Textiles
Munsell Soil Color Charts	(240)	Soil – wet and dry
Villalobos Colour System	(7000)	Colour specification in South America

\* There are no clear-cut methods of grouping colour systems, standards and theories. This and Table 2 are included here primarily to indicate some of the more popular options to the preferred CIE or Munsell notations.

**Table 2**

<b>Colour Standard/ Company</b>	<b>Comment</b>
Nu-Hue Custom Colour and Nu-Hue Colour Coordinator/ Martin-Semour Co.	N/A
Calibrated Colors (II and III) Pratt & Lambert	900 commercial standards; more than many other commercial standards
Benjamin Moore	1200 commercial standards/25 000 special- order colours available
Bapco	N/A
Sico	Good dark ranges

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D1729-69	Standard Method of Visual Evaluation of Color Differences of Opaque Materials.
D2616-68	Standard Method for Evaluating Change in Color with a Gray Scale.
D3134-74	Standard Recommended Practice for Selecting and Defining Color and Gloss Tolerances of Opaque Materials and for Evaluating Conformance.

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1-GP-12c Part I	Standard Paint Colours, Colour Identification and Specification
1-GP-12c Part III	Standard Paint Colours, Chromaticities and Luminous Reflectances
1-GP-71	Methods of Testing Paints and Pigments
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**VOLUME III**  
**HISTORIC SITE**  
**ANALYSIS**

**10.3**  
**SPECIAL INVESTIGATION AND ANALYSIS**  
**MOISTURE CONTENT**

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(THERMOGRAPHY)

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## 7.0 BIBLIOGRAPHY

## 1.0 INTRODUCTION

A certain amount of water in vapour form is always present in the atmosphere. Under certain circumstances humidity may precipitate on building materials, causing various defects. The purpose of this article is to explain briefly the sources of humidity in buildings, the harm it can cause to building materials and the methods used to detect and measure humidity. The steps to be taken to avoid accumulation of water vapour and to prevent the deterioration of materials is not within the scope of this article.

This article is for the use of managers of historic properties. To assist the understanding of problems by non-technical persons, many subjects are explained in a simplified manner.

## 2.0 NATURE OF HUMIDITY

Water is always present in some form or another in the environment. Some of this water evaporates and is dispersed in the form of vapour in the atmosphere. This water vapour in the air is commonly called "humidity."

The amount of water which may be dispersed in the form of vapour depends on the temperature of the air. The higher the temperature of the air, the more vapour can be dispersed. When the air at a given temperature contains all the vapour it can support, the situation is called "saturated." Saturated air at 20°C contains more water vapour than saturated air at 15°C.

In building practice, the amount of vapour present in the air is expressed as "relative humidity." Relative humidity is a measure of the amount of water vapour present in the air, expressed as the percentage of the maximum amount the air could support at that given temperature, e.g. if at a certain temperature the air contains half as much vapour as it possibly could contain, the condition is called 50 percent relative humidity.

When warm air is in contact with cold surfaces, a layer of air near the surface will cool down radically. This cold air cannot support the water vapour anymore; therefore, the vapour will be deposited on the cold surface. This phenomenon is called "condensation." Condensation is often observed in a humid and warm room on cold window panes.

It is an important characteristic of water vapour that it migrates from areas of high humidity to areas of low humidity. Water vapour will migrate even through masonry walls.

The amount of water vapour which may be dispersed in the air at various temperatures and at various percentages of relative humidity can be interpolated from Fig. 1., e.g. if in a room the temperature is 23°C and the relative humidity is 100 percent, then on a single pane window, which is -5°C about 15 g of water will condense for every m<sup>2</sup> of air from the room. See Fig. 2.

## 3.0 SOURCES OF HUMIDITY

Some water vapour is always present in normal atmospheric conditions. The most common sources of humidity inside buildings in Canada are listed below:

- a. **Atmospheric Conditions:**  
When due to weather conditions the outside air is humid, it will penetrate the building through openings, around doors or windows, through other cracks and through porous building materials.
- b. **Human Occupancy:**  
Humans (and animals) constantly perspire to some degree. The more vigorous the activity, the more the body will perspire and the more vapour will enter the environment.
- c. **Household Activities:**  
Large amounts of water vapour are generated by cooking, washing, bathing and similar common household chores. Leaking or dripping household appliances are another source of humidity.
- d. **Building Materials:**  
Certain building materials, especially when newly placed, will release water during the aging process. This includes the drying out of wood and the curing of mortars.
- e. **Precipitation:**  
Rain or melting snow frequently penetrates buildings through cracks. During the drying process, some water from wet building materials may migrate inside the building.
- f. **Groundwater:**  
Water from subterranean sources or from a poorly drained landscape, can enter the building. Entry is gained either through cracks and joints or by capillary action through porous building materials.



g. **Splash Wetting:**

Falling water hitting hard surfaces, such as walks around buildings, bounces back and splashes on lower parts of walls, wetting the surface. Similar splashing may occur when rain is dripping from roofs and splashes back to the wall from projecting surfaces.

wood may split or warp badly. Moreover, highly acidic waters may dissolve certain organic constituents of the wood.

#### 4.5 PAINT DETERIORATION

Many types of paint may be dissolved or discoloured by condensation. Water vapour percolating through walls can cause blistering or peeling of paints.

#### 4.6 EFFLORESCENCE AND SUBFLORESCENCE

Efflorescence is a whitish deposit found on the exterior façade of masonry. When vapour percolates through the pore structure of masonry, from humid interiors to less humid exteriors, some of the calcium-based compounds are dissolved and carried to the surface by the water. When the moisture evaporates, the calcium spots crystallize leaving a whitish deposit on the surface.

If the flow of vapour to the masonry surface is impeded, e.g. due to a build up of pollutants on the surface, evaporation may take place within the pore structure of the masonry. The resulting crystallization of dissolved salts below the surface, called subflorescence, can cause breakage of the pore walls and spalling of the masonry surface.

In addition to the calcium salts from the masonry and mortar itself, other salts may be present in solution within the pore structure. They may originate from ground water drawn into the masonry as rising damp or from the penetration of rain water which, in heavily polluted areas, may contain dissolved salts. Seawater or de-icing salts can also contribute to the problem.

#### 4.7 FREEZE-THAW CYCLES

In cold weather the vapour in the pores of masonry may freeze. When water freezes, that is, changes from a liquid to a solid, it increases in volume. The resulting ice pressure causes the pore walls to collapse. This effect is magnified when the temperature falls rapidly, since the moisture contained within the pores has no opportunity to migrate toward the surface where harmless evaporation can occur. When it cools, water expands somewhat. The expanding and freezing water can split even the strongest masonry materials.

### 4.0 EFFECTS OF HUMIDITY

While a relative humidity of 40 percent to 60 percent is desirable for normal human comfort, the condensation of humidity in parts of a building can cause serious defects in building materials. For a full discussion of such problems, see Vol. VI, "Conservation of Materials." Some of these defects are listed here.

#### 4.1 FUNGAL DECAY

When the moisture content of wood is between 20 percent to 30 percent at normal room temperatures the conditions are favourable for the growth of different types of fungi. By secreting various enzymes, the fungi digest the organic substances of wood. This is commonly called "rotting wood." Even when the wood is dry, the so called "dry-rot" fungi will conduct water from other wet spots in the building to the wood.

#### 4.2 INSECT DAMAGE

Many wood-destroying insects prefer wet wood. Some insects attack wood after it is partly digested by fungi. These fungi would not be present if the wood was not wet.

#### 4.3 CORROSION

Moisture in wood will quickly corrode nails, screws and other metal fasteners. In brick or stone walls, the percolating moisture will corrode the masonry-ties and tie-rods. In concrete structures, the reinforcing bars will corrode. The deteriorated metal parts will greatly reduce the load bearing capacity of the structure. A sure sign of moisture in buildings is reddish spots of rust around nail-heads in walls.

#### 4.4 TIMBER FATIGUE

The moisture content of wood fluctuates under normal conditions. Due to the high stresses caused by constant drying and wetting, swelling of wet wood and shrinking of dry wood, the

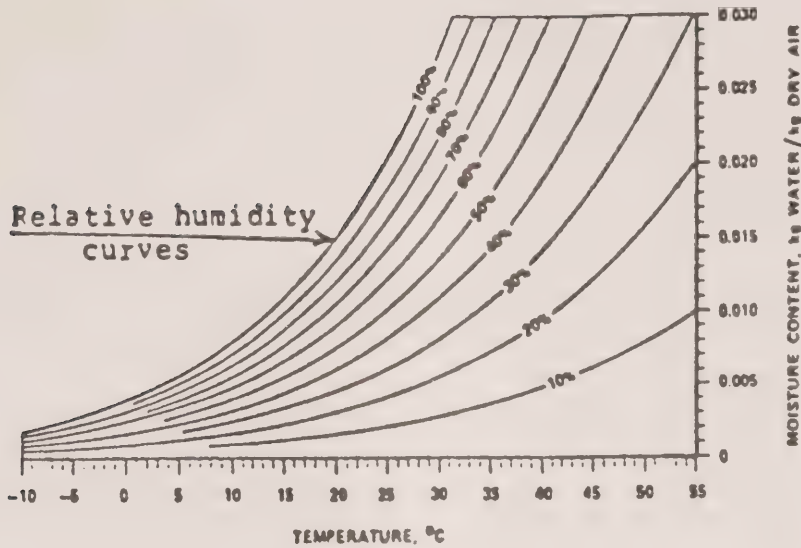


Fig. 1

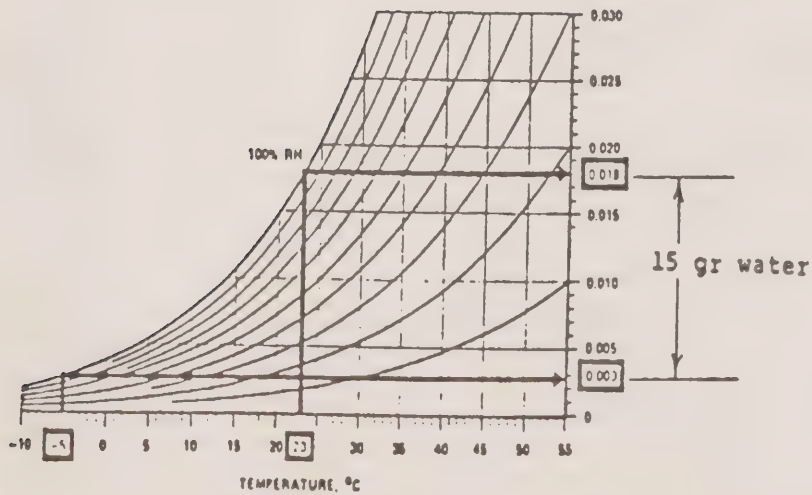


Fig. 2

#### 4.8 VEGETATION GROWTH

Moisture promotes the growth of mosses, lichens and fungi, some of which cause serious deterioration to wood. When the accumulated dust in masonry joints or cracks becomes wet, an environment suitable for the growth of vegetation occurs. Spreading roots may break apart mortar and masonry.

#### 4.9 ELECTRICAL FAILURES

Condensed humidity can cause many types of problems in electrical systems. It can corrode the metal parts of controls and connectors, it can reduce the effectiveness of certain insulations and conduct currents. Wet conditions can make electrical motors and instruments inoperative.

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### 5.0 MOST VULNERABLE BUILDING PARTS

#### 5.1 COLD SURFACES

Water vapour may condense on any surface that is colder than the general ambient temperature. Damage may occur at the point of condensation or water may flow or percolate to other locations and cause damage there, leaving the place where condensation occurred unharmed. The best example of such conditions are windows. Condensation on windows occurs on the glass panes but the dripping water will cause decay on the wooden frames and sills.

Surfaces prone to condensation include: floors, above unheated spaces, outside walls, windows and interior surfaces of roof trusses.

#### 5.2 WETTED SURFACES

Surfaces which are frequently wet, due to rain, fog, surf, etc., are prone to problems. These include walls exposed to prevailing winds, roofs and porches or other exposed horizontal building projections.

#### 5.3 CONTACT OF DISSIMILAR MATERIALS

Where materials with dissimilar specific heats are in contact, condensation may occur. This is especially evident where lumber and masonry are in contact. A typical example is the decay of joist ends which rest on concrete or stone walls.

#### 5.4 THROUGH WALL FITTINGS

Pipes, electric boxes, nails, bolts and other metallic fittings with high heat conductivity are prime locations for water condensation.

#### 5.5 UNVENTED SPACES

Humidity accumulates in spaces where there is no regular ventilation. In kitchens, bathrooms and public washrooms, the fans are frequently not sufficient to ensure regular air changes. There is frequently no ventilation inside wall cavities, closets and storage rooms or in crawl spaces.

#### 5.6 ABSORBENT MATERIALS

Buildings contain many materials which are porous, pulpy or spongy and can absorb large amounts of humidity. Glass fibre insulation is among the most absorbent materials.

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### 6.0 DETECTION AND MEASUREMENT

There are several instruments in use to measure humidity or detect dangerously humid conditions. A list of the most important types follows.

#### 6.1 MEASURING ATMOSPHERIC HUMIDITY

The most common source of wetness inside buildings is the high humidity of the interior space. There are three systems used generally to measure the relative humidity:

##### a. Wet Bulb Thermometer:

Historically, the most common instruments are the so-called wet bulb thermometers. These consist of two mercury thermometers. One measures the temperature like any other thermometer. The other thermometer's bulb is wetted and the water evaporated. Because of the heat energy consumed for evaporating the water, this thermometer will indicate a different temperature. By interpolating the readings of the two thermometers on a table or chart, the relative humidity of the ambient air can be calculated.

b. Recording Hygrometers:

These instruments record, on a moving chart, the variations of relative humidity. Such instruments are quite expensive and are therefore used most often to record the relative humidity in museums and similar institutions where moisture-sensitive material is being stored.

c. Electronic RH Meters:

Today there are several relative humidity meters manufactured by high technology companies. These meters are hand held and immediately indicate on a digital or analog scale the relative humidity of the atmosphere.

## 6.2 HUMIDITY PROBES

Humidity probes measure the wetness or water content of various materials. The instruments can be calibrated for use with wood, masonry, fabrics, soil and other building materials. Some of these instruments measure not only the wetness of the tested material but also the salinity of the water.

These instruments consist of two probes which are driven into the material. They measure either the electrical conductivity or resistance between the probes. Since these properties depend on the wetness of the tested material, the instruments indicate the percentage of water present.

## 6.3 GRAVIMETRY

In cases where extreme accuracy is desired, gravimetry can be applied when a small sample of the wet material is collected. The sample is weighed and then the water is evaporated in a furnace. When the sample is weighed again, the weight differential represents the water content.

## 6.4 DETECTORS

These instruments are capable of indicating the presence of wetness in concealed spaces. It is not necessary to drill or break through the outer layer of walls to detect humidity in the cavities. Moreover, these detectors can follow the concealed route of water to the point of entry.

These so-called "leak seekers" or "tracers" emit low frequency signals through the covering material. When the signals come in contact with a moist layer the circuit is completed and the

instrument indicates the presence of water. Some instruments give a warning sound only, while others indicate the degree of wetness on a scale.

## 6.5 INFRARED DETECTORS (THERMOGRAPHY)

These instruments measure the radiation of infrared wavelengths of heat radiated from buildings. Since wet building materials radiate differently than dry materials, the difference is detected by the instrument. Most detectors produce an image of the building and the various materials are shown with different shades. One of the great advantages of infrared detectors is that a large section of the building can be viewed from some distance. The interpretation of the results of thermography requires skilled operators.

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